

Swiveling Bar Stools

How to Bleach Wood

Biscuit Joiner Review

TODAY'S

Issue 13

\$3.95

WOODWORKERTM

PROJECTS, TIPS AND TECHNIQUES



TODAY'S

WOODWORKER™

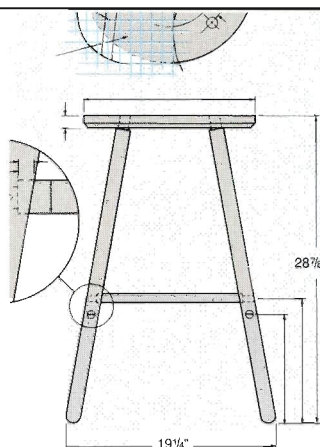
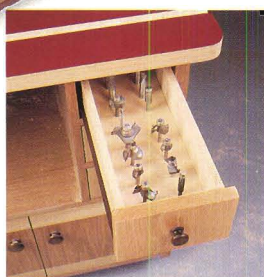
PROJECTS, TIPS AND TECHNIQUES



8 A Router Table for Today's Woodworker

By Rick White

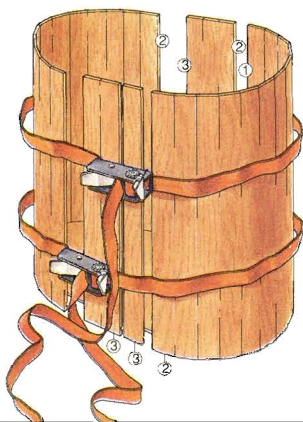
Our third annual shop project is the all important router table.



15 Swiveling Bar Stools

By Chris Inman

With sculpted seats and built in lumbar support, you can get real comfortable in Chris' swiveling bar stools.



20 Stave Construction Wastebasket

By Frank Martin

We took Frank's clever stave construction design and put it to the test. It works!



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You won't like splitting elm, but you'll love how it finishes.

Safety First!

Learning how to properly operate power and hand tools is essential for developing safe woodworking practices. For purposes of clarity, necessary safety guards have been removed from the equipment shown in some of the photos and illustrations in Today's Woodworker. We in no way recommend using this equipment without safety guards and urge readers to strictly follow manufacturer's instructions and safety precautions.

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Four More Pages!

We're growing again! Our first issue in January 1989 was 20 pages. In short order we brought it up to 24 pages and now, with this issue, we're moving up to 28 pages. Our gallery has grown from one page to two pages and Today's Wood has been moved from the table of contents to the back page. In addition, we'll be opening up the project articles a little more, expanding the art and making sure that every step gets fully covered. Beyond that, we'd like to hear from you, the reader, when it comes to using our new pages. For instance, what about a simple, one weekend project every issue?

It's January again, so it must be time for a cover project for the workshop. With a European Workbench (1990) and a tool center (1989) behind us, the consensus was that the next most important shop project would be a good router table. There's just no other tool quite as versatile as a router, and no better way to use it than in a specially designed table.

As we enter our third year, we're more eager than ever to hear from you. Please submit your tricks of the trade, project proposals and photos of your best pieces for the gallery.

Larry N. Stouken

I enjoyed building our futon sofa-bed featured in the July/August 1989 issue, and would like to offer the following two corrections. The templates for parts 12, 16, 17 on page 10 do not match up with your material list on page 13. The templates show a height of 5" total, including the tenons. The material list reflects a 5 1/2" total, which is correct. Readers should extend the height of each of these pieces to match the material list (keeping the tenons at 1/2"). A more obvious error in figure 2 shows the top of piece #13 being 27 1/2" long. If you start by marking the bottom 27" long and draw a 14° angle off the back, the top of piece 13 will actually be 28" long.

You will get a real workout on mortise and tenon joinery as I counted 32 of these joints. I cut all of the mortises and tenons with a router. Keep up these types of unique and interesting projects.

*Jim Barrett
Redmond, Washington*

TW responds: Thanks for the corrections Jim, and for the photo of your beautiful piece. All back issue sales of that issue will now include a correction sheet, thanks to you.

My father-in-law and I are amateur woodworkers and have been subscribing to your magazine for about a year. In your Nov/Dec 1990 issue 12 you featured a beautiful butternut bureau which looks easy to build. Does your project designer (Dan Jacobson) have some ideas for a matching bed frame on the drawing board? I am always excited to get the next issue of Today's Woodworker.

*Dean Vonfeldt
Cumming, Georgia*

TW responds: Dan does have some rough sketches, but we're still wondering whether to match the bureau or undertake a different style altogether. A few more letters like yours could easily settle the issue.



I enjoy your magazine very much. After reading the current issue, I am waiting to try to revive my long lost skill at spinning tops. The real purpose of this letter is to chide you on your choice of words in describing the clamping device used to hold wood firmly while it is being worked on. Most of us call this a vise, but I have noticed that a goodly number of woodworking publications insist on calling it a vice, although I can detect no moral connotations in such a device. You not only printed Mr. Watson's letter with this error, but you added your editorial comment and compounded the error by repeating it. Sentence your proof reader to a session with the dictionary!

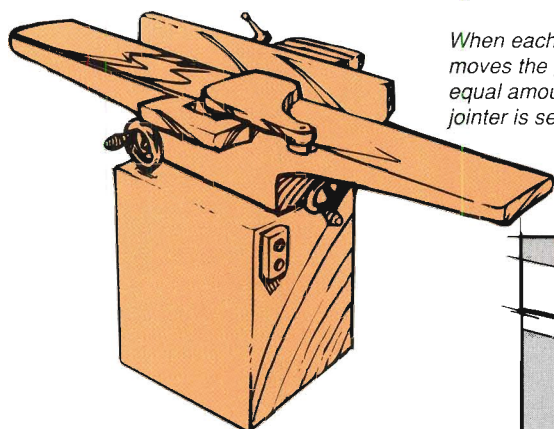
*R. H. Breckenridge
Lindale, Texas*

TW responds: Or maybe we should just put his thumbs in a vise for this vice!

I enjoy your publication very much. Not too bulky, good quality paper, good graphics, no extraneous material, good projects, and it doesn't take forever to read! A very nice publication.

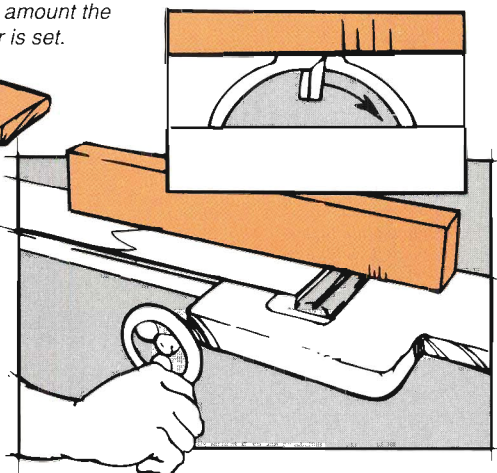
*Robert E. Sakett, Sr.
Citrus Heights, California*

Setting Jointer Knives and Repairing Finishes



When each knife moves the gauge an equal amount the jointer is set.

For safety, unplug the jointer and use the pulley belt to rotate the blade.



Setting Jointer Knives

Most of us sharpen our jointer knives far less often than we really should because setting up the jointer correctly can be so difficult. Here is a simple method that makes the task so much easier that you'll never hesitate to remove your jointer's knives again.

Joint a scrap of wood that is 15 to 18 inches long. Make four or five marks at 1/8" increments, beginning five inches from one end of the scrap. I make a new gauge every time I change cutters to insure that the gauge is flat.

Install the sharpened blades into the cutterhead and adjust their height using the wooden gauge. Span the cutterhead gap with the gauge, aligning the first mark on the gauge with the edge of the in-feed table. Rotate the cutterhead, raising the blade until it snags the gauge and moves it slightly. Very small adjustments of the cutter screws will move the blade a lot (each 1/8" movement of the gauge represents about .001" rise in blade height). I set the cutter screws after the gauge moves exactly 1/4 inch at the left and the right ends of each blade. The .002" blade height gives me clean, snipe-free cutting.

Now that I've mastered this method, I can accurately change the knives in my 10 1/2" jointer in five to ten minutes.

*Bill Flemming
Beaver Dam, Wisconsin*

Preventing Wood Filler Dry-out

The most common problem when working with canned plastic wood putty or pre-stained fillers is that the product quickly dries out due to rapidly evaporating solvents.

To extend its working time and reduce waste, take a tablespoon of putty or filler out of its container and put it in a plastic sandwich bag. Twist the bag tightly around the material and slit a small corner of the bag. When you need a little, just squeeze the ball of putty or filler and a small quantity will ooze from the corner of the bag. The material in the bag remains moist and the bulk of the supply is kept fresh in its sealed can.

*Larry Bedaw
N. Swanzey, New Hampshire*

Applying Contact Cement

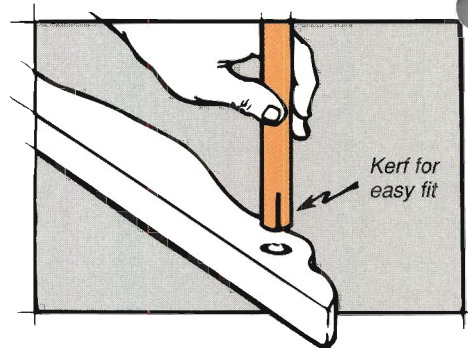
Applying contact cement can be a very messy job, but I've come up with a few tricks that will keep it under control. Start with a three inch disposable roller with a plastic handle. Put a drop of oil on both ends of the plastic roller arm so that the roller head turns smoothly. This also helps to keep the excess contact cement from seeping into the roller head.

When you're ready to start, pour your contact cement into a 1" deep Tefloncoated baking pan and tip it so it can be used like a paint roller tray. Always apply thin coats, one coat on

nonporous surfaces, and two on porous surfaces. When you're finished applying the contact cement, pour most of the excess from the pan back into the can, and let the rest dry. You'll find that the contact cement can be easily pulled out of the pan if allowed to fully dry. If any remains behind, a small amount of acetone can be used to clean up.

To clean the plastic parts of the roller, pour a good 1/2" of contact solvent into a coffee can and soak the parts overnight. In the morning remove your parts and wipe off any excess contact cement. The plastic parts will be slightly swollen, but if you leave them out to dry, they'll return to their original size.

*Jan McNalley
Tulsa, Oklahoma*



Quick Dowel Fits

Sometimes new dowels are just a little oversized. Instead of spending lots of time and energy reaming out the hole or sanding the dowel to fit, try making a simple saw kerf cut in the end of the dowel equal in length to the depth of the hole.

*Alice & Robert Tupper
Canton, South Dakota*

(More Tricks on page 7)

Today's Woodworker pays from \$20.00 (for a short tip) to \$100.00 (for an elaborate technique) for all Tricks of the Trade published. Send yours to Today's Woodworker, Dept. T/T, Rogers, MN 55374-0044.

The Elegant and Subtle Knife Hinge

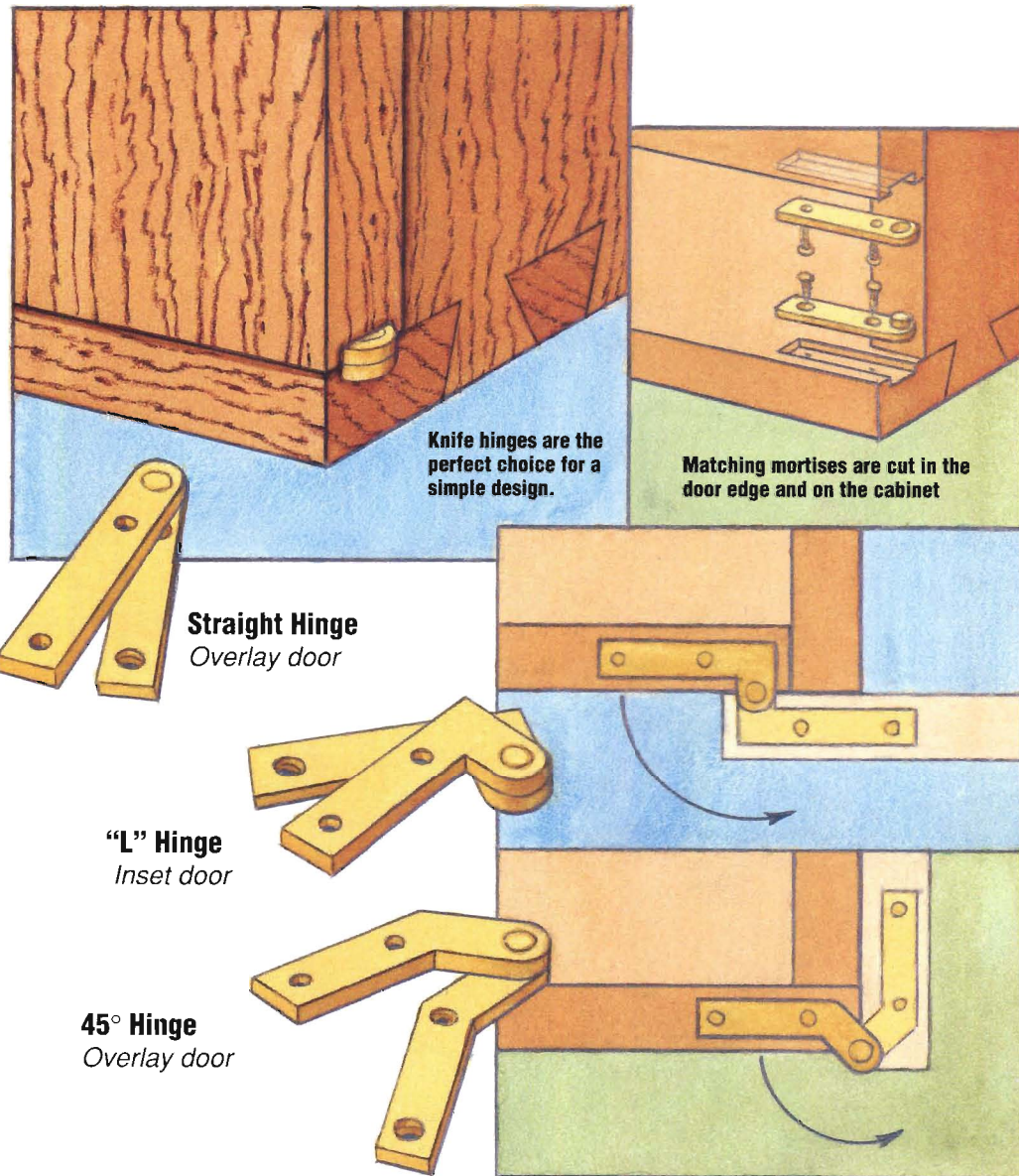
Among the most graceful types of hardware available are knife hinges. Unfortunately, they languish in relative obscurity, particularly when compared to European concealed hinges and the common butt hinge. This is due, in part, to confusion surrounding the use and installation of knife hinges. In fact these are very simple devices to install, as long as you recognize their limitations.

As with most hardware, if you want to incorporate a knife hinge into your project you must start at the design stage. That's because they will only work in applications where the cabinet's top and bottom extend over the top and bottom edges of the door. The knife hinges are then mortised into the top and bottom door edges and, correspondingly, into the top and bottom panels of the cabinet. The depth of the mortise should equal the thickness of the hinge leaf.

Two types of cabinets fulfill the general requirements listed above. In the first type, referred to as an inset door cabinet, the door edges are completely surrounded by the carcass walls. The second cabinet variation, called an overlay door cabinet, is formed when the door covers the front edge of the side walls.

If your project design will accommodate a knife hinge you'll find three common types are available, in a variety of finishes. The most common type is the straight variety. This hinge is generally used on overlay doors. The hinge is positioned so that the pivot point is at the outside edge of the door, enabling the door to swing about 210°. This is a real advantage if you need full access to the interior of the cabinet.

The second type of knife hinge is "L" shaped and is most commonly used for inset doors. The mortise is cut into the top and bottom edges of the door, but takes a right turn to exit out the front of the door. After installation a small portion of the hinge



shows on the cabinet's face. In this installation the "L" shaped hinge allows the door to swing 180°.

A third type of hinge claims the middle ground between the first two varieties. This design features a 45° angled turn leading to the pivot point and is normally used on doors overlaying the cabinet sides. As an overlay door hinge this style offers greater opening capacity, allowing the door to lay flat against the outside of the cabinet wall.

All three knife hinge styles can be adapted to either inset or overlay cab-

inets. The "L" shaped hinge, for instance, can also be used on overlay doors if you want the door to pivot widely away from the cabinet, perhaps to swing clear of an adjacent cabinet.

Installing knife hinges leaves only a tiny bit of exposed hardware on the cabinet surface, and what does show is very elegant and subtle. In most cases the hinge is hardly noticeable on the face of the cabinet, making it an ideal choice when your goal is highlighting the qualities of the wood or the simplicity of your design.

An Ideal Lathe Attachment

By Richard Dorn

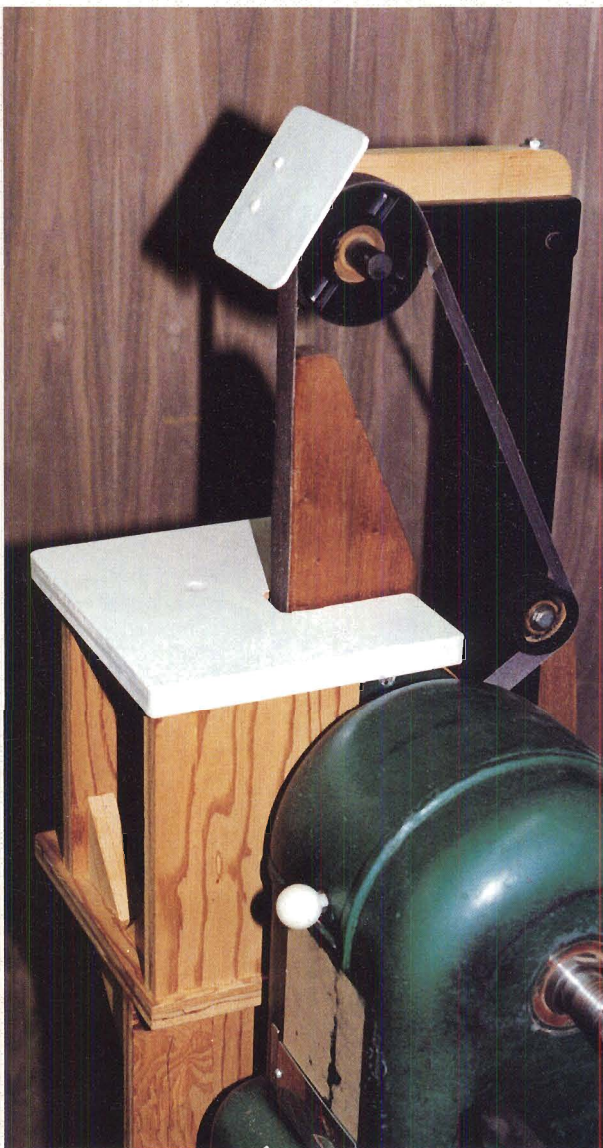
When the loud motor on my sander/grinder stopped working recently, I didn't even think about getting a new one. I simply tossed the motor, made a few quick modifications, and then mounted the sander/grinder on the outboard side of my wood turning lathe.

As a result, I enjoy this tool more now than I did when it was brand new. The loud noise is gone, the speed can be easily adjusted, it has more power, and it is a smoother working sander because it's now a stationary tool.

Most of the sander/grinders available these days are designed to use 1" x 30" or 1" x 42" sanding belts which travel over three flat pulleys arranged in a triangular pattern. The lower pulley is attached directly to the motor and serves to drive the sanding belt. The top pulley, which is kept under spring tension to keep the sanding belt tight, is vertically aligned with the lower pulley and generally features a simple mechanism to change the angle of the pulley axle so the belt tracks straight. A third "idler" pulley is located at the rear of the vertical frame to allow the work surface of the table adequate clearance. The table is small and a curved or flat metal platen is positioned behind the sanding belt to absorb the pressure of the work during sanding operations.

When I decided to mount the sander/grinder on the outboard side of my lathe, I started by removing the motor housing and the motor. Next the attached lower pulley, table, and platen arrangement were removed so all that remained was a vertical and horizontal frame, the top pulley, and the idler pulley. The all important spring-loaded belt tightening mechanism remained intact as well, along with the belt tracking system. If you were to build such a jig from scratch, these two parts would prove to be the most difficult to duplicate. Both are essential for smooth operation.

To replace and duplicate the size of the original lower drive pulley, I laminated together some hardwood,

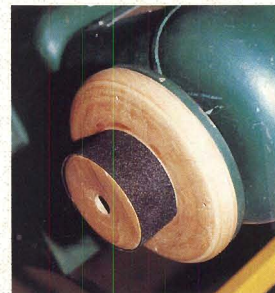


screwed it to the outboard faceplate and turned it in place. The completed pulley was varnished and covered with anti-skid tape to prevent slippage of the sanding belt.

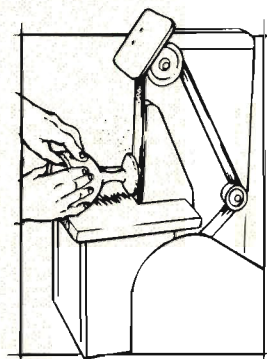
At this point, the sanding attachment was constructed by trial and error. When you're putting a jig like this together, much depends on the particular lathe that it is being attached to. In my case, a piece of plywood was placed against the outboard end of the lathe and secured with bolts and wing nuts for easy removal.

A flat plywood surface was attached to that piece at a right angle and carefully braced so it would support the vertical frame of the sander as well as its two vertical table supports. The size of the table was also increased slightly at this point and positioned just above the headstock of the lathe.

I constructed a new platen out of 1" thick wood and fastened it to the table top from underneath. I found that it's much more stable than the original metal platen as pressure is applied during sanding tasks. This



The new lower drive pulley is turned right in place on the outboard faceplate, which serves as the power source for the salvaged strip sander.



Richard Dorn's strip sander was given new life after the original motor blew. With a few modifications, the unit now runs off the outboard faceplate of the lathe. Dorn notes that with an alternative platen arrangement and a piano hinge, the top could easily be tilted to hone turning tools.

Keep Some Alcohol in the Shop

White rings from drinking glasses and flower pots are a common form of water damage to shellac or lacquer finishes. The white color is caused by water absorbed by the finish, and can be removed by wiping the finish with alcohol. Alcohol has a much greater affinity for water than shellac or lacquer, and will absorb the water, pulling it off of the finish. However, alcohol will dissolve shellac and is a component of many lacquer thinners, so great care must be taken to avoid damaging the finish. The risk of damage can be reduced by selecting the right type of alcohol.

Three different alcohols are commercially produced: Methanol (also known as wood alcohol or methyl alcohol), ethanol (also called grain alcohol, denatured alcohol or ethyl alcohol), and isopropanol (also called isopropyl alcohol). Methanol is considered the best solvent but it's very toxic, so ethanol is substituted whenever possible. Isopropanol is the least effective solvent and is therefore the best choice for removing white rings.

Fortunately low moisture isopropanol is inexpensively available at most gas stations as fuel line drier (in my area, the key brand name is "IsoHEET"). Beware of the cheaper grades because they tend to use methanol (check the label, a toxicity warning is required with methanol).

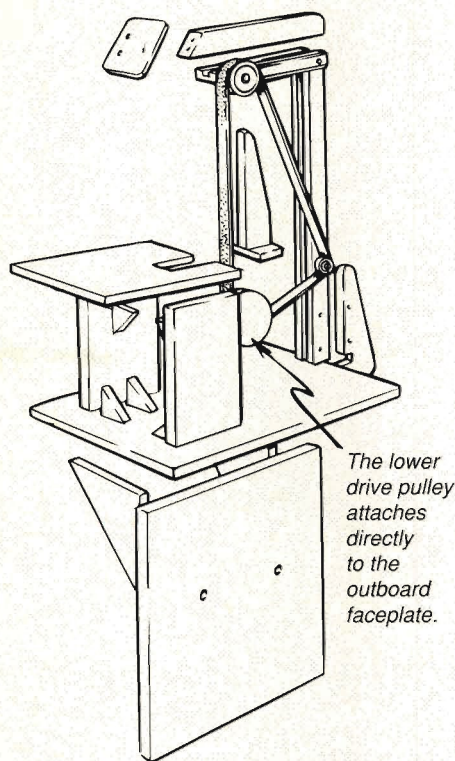
To use, lightly dampen a soft cloth and gently wipe the white area. Several applications may be required, but allow any alcohol left on the finish to dry between applications to avoid softening the finish. As a test I shellaced some birch plywood, left a wet glass on it, then removed the white ring. Elapsed time from applying the shellac to wiping it with alcohol was less than 12 hours, yet the alcohol caused no damage.

Above all do not try to use rubbing alcohol. Rubbing alcohol is isopropanol diluted with water to lessen the chance of allergic skin reactions. The combination of alcohol and water will soften the finish and drive water deeply into it, caus-

ing even worse damage.

Finally, if your stain results from spilled liquor or nail polish remover, alcohol will not work. In this case, the stain must be removed by sanding the damaged area to remove the discolored finish. If the finish is not sanded down to bare wood, polishing the area with pumice and rottenstone will restore the shine. If you must penetrate to the bare wood to remove the stain, try French polishing to repair the finish.

Allen Grantham
Minneapolis, Minnesota



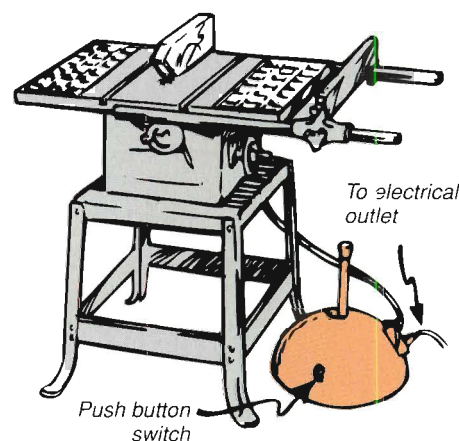
This exploded view illustrates how simple it is to expand a lathe's capabilities by using the outboard faceplate as a power source.

arrangement does eliminate the possibility of tilting the table, but I wanted to keep the construction simple and lightweight anyway, so this was not a problem for me. If you want the table to tilt, you could easily incorporate an adjustable lid support and come up with another way to attach the platen. I do recommend adding a small shield at the top of the sander to deflect any material that the sanding belt carries over the top pulley.

When I'm ready to use the lathe, it only takes a moment to remove the sanding belt to prevent needless wear on the pulley bearings.

As mentioned earlier, there are many models and sizes of wood turning lathes and sander/grinders. If you're willing to undertake a little trial and error construction (which I really enjoy) I think you'll find that any combination, with the right modifications, will make an ideal lathe attachment.

Richard Dorn is a woodworking instructor at Oelwein Community Senior High School.



Stationary Tool Safety Switch

Don't discard that old pole lamp with the push-button switch in the base. With simple modifications this fixture will free your hands from reaching under a router table or saw to turn the machine on and off.

Remove the bulbs and all but the last section of the pole. Mount a two gang receptacle on the base, wiring it to the switch and adding a power cord with a plug to reach an outlet. Insert the plug into a hot outlet and plug your machine's cord into the receptacle mounted on the lamp shroud. With a slight tap of the foot on the base mounted switch you'll start the machine. Putting a rubber crutch tip on the end of the pole makes it easy to move the foot operated switch from one machine to another.

Robert O. Wendel
Marlboro, New Jersey

Gear up for absolute precision with this rugged shop workhorse.

As is our custom, the first issue of each year features a tool for the shop. For our premiere issue in 1989 we built a rolling tool center for storing many of our hand and portable power tools. The following January we constructed a beautiful maple and padauk European workbench, which has been very popular with our readers. And this year's first issue brings what we consider to be the next most important piece of shop equipment, the router table.

Designing a router table involves two challenging requirements, and our group of woodworking experts has come up with very good solutions. The first challenge is making the router easily accessible for exchanging bits or adjusting their height. On our cabinet the router can be removed through the table top for major alterations or adjusted from the front for raising and lowering the bits. The second hurdle is designing a fence that works for every possible routing operation. Our system begins with a conventional fence that adjusts quickly for general routing. With the addition of an Incra jig attachment, the fence system offers precise, incremental adjustments for routing perfect dovetail joints, finger joints or flutes.

A wooden workbench with a red top and drawers. The workbench is made of wood and has a red top surface. It has a large open space in the center for working, and several drawers on the right side. The drawers have black handles. The workbench is on four black casters.

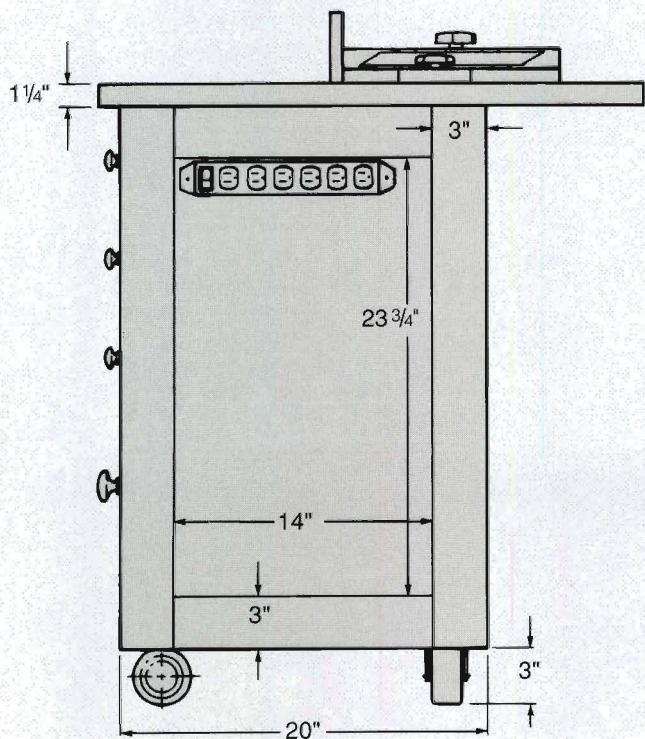
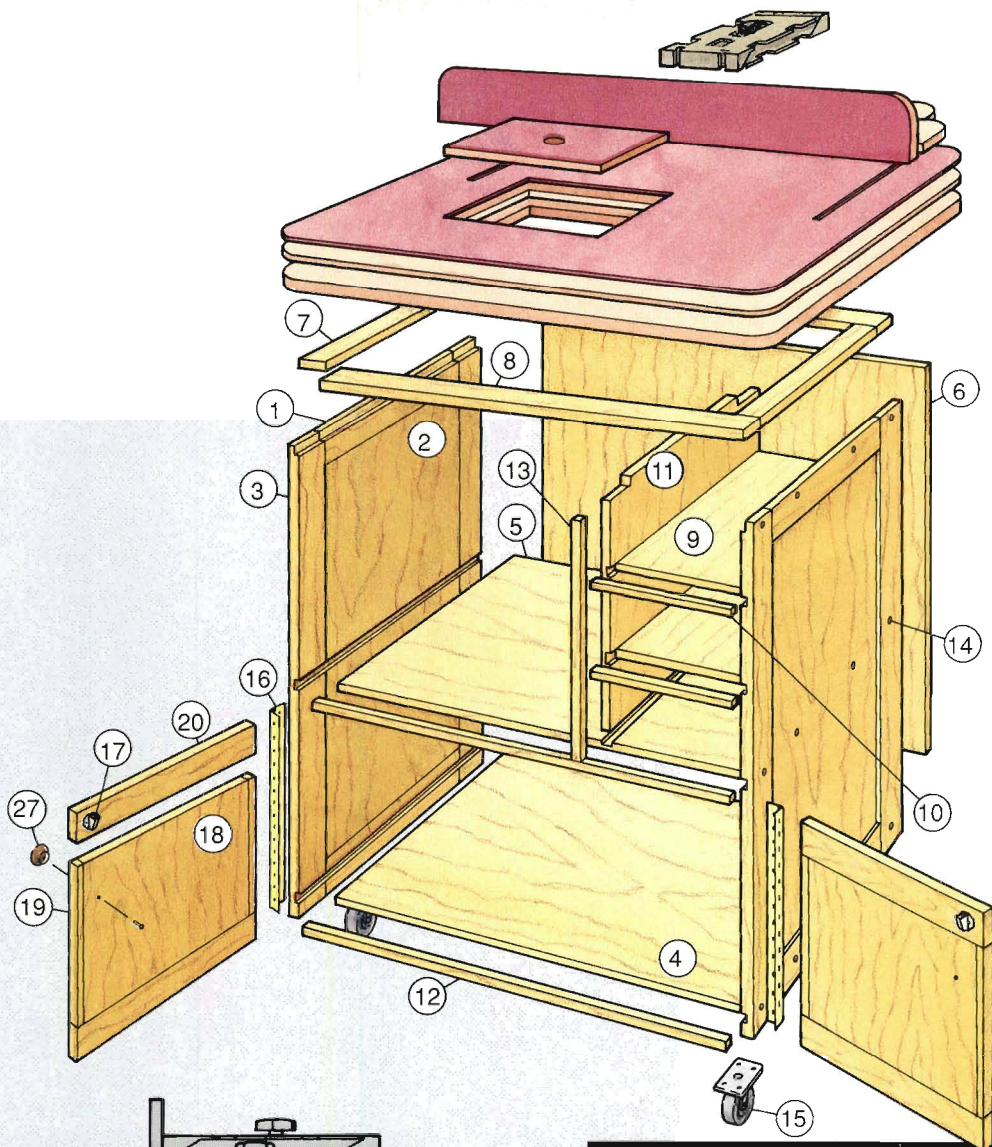
Technical drawing of a mechanical device, showing top and front views with dimensions.

Top View Dimensions:

- Overall height: 30"
- Central vertical assembly with a star-shaped component on each side.
- Bottom section with a central crosshair and a circle.

Front View Dimensions:

- Overall height: 34"
- Top section width: 31"
- Lower section height: 29 ³/₄"
- Internal dimensions and hole specifications:
 - 14 ³/₄" (vertical distance)
 - 17 ³/₈" (horizontal distance)
 - 1 ¹/₄" access hole (circle)
 - 4 ³/₈" (vertical distance)
 - 7" (horizontal distance)
 - 1" (horizontal distance)
 - 12" (vertical distance)
 - 1 ³/₄" (vertical distance)
 - 1 ¹/₂" (horizontal distance)
 - 12 ³/₈" (horizontal distance)
 - 1 ³/₄" (horizontal distance)
 - 27 ¹/₂" (bottom width)



MATERIAL LIST - CABINET

	T X W X L
1 Side Wall Rails (4)	1 1/16" x 3" x 14"
2 Side Wall Panels (2)*	3/4" x 14" x 23 3/4"
3 Side Wall Stiles (4)	1 1/16" x 3" x 29 3/4"
4 Bottom Shelf (1)*	3/4" x 19" x 25 3/4"
5 Center Shelf (1)*	3/4" x 19" x 25 3/4"
6 Back Panel (1)*	1/4" x 25 3/4" x 29"
7 Web Frame Rails (2)	3/4" x 2 1/2" x 14 3/4"
8 Web Frame Stiles (2)	3/4" x 2 1/2" x 25 3/4"
9 Drawer Dividers (2)*	3/4" x 7 1/2" x 19"
10 Drawer Divider Banding (2)	3/4" x 3/4" x 7 1/2"
11 Upper Section Divider (1)*	3/4" x 19" x 15 3/4"
12 Shelf Banding (2)	3/4" x 3/4" x 25 3/4"
13 Upper Divider Banding (1)	3/4" x 3/4" x 15 3/4"
14 Walnut Plugs (24)	3/8" Diameter
15 Casters (4)	2 Swiveling & 2 Fixed
16 Piano Hinge (2)	1 1/4" x 12"
17 Door Catches (2)	White Plastic

* Plywood

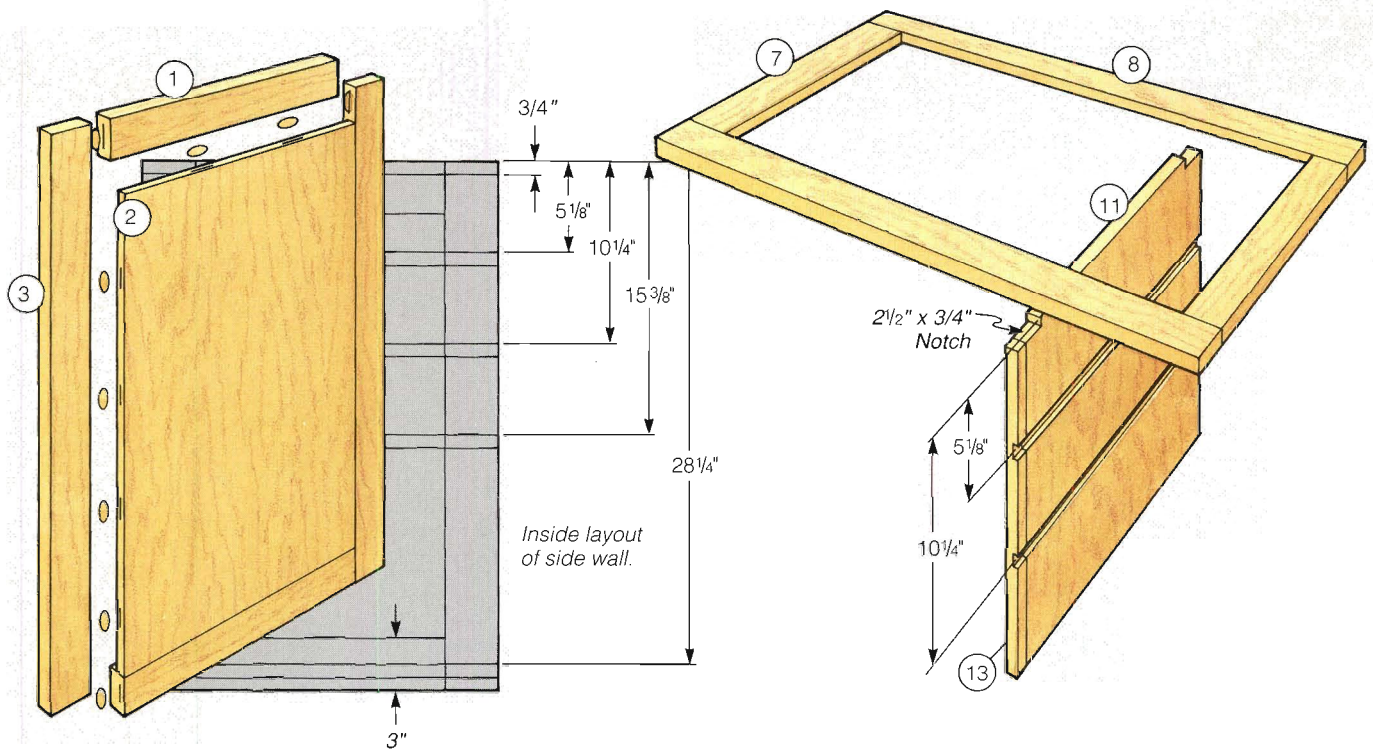


Figure 1: Side view (left) and top web frame with upper section divider (right).

need to be mobile, so we put wheels on the router cabinet to get it out of the way when it's not needed. The drawers provide storage space for router bits and accessories, and the lower cupboard shelters power tools from all the dust in the shop. The addition of an electrical strip on the right side of the cabinet is a handy feature which provides easy access to the on/off switch.

I built the router cabinet from white oak, using a half sheet of 3/4" plywood, 11 board feet of 1 1/16" thick solid stock and 4 board feet of 3/4" thick material. Making the top requires a half sheet of 1/2" thick baltic birch plywood and another half sheet of 3/4" baltic birch plywood. In addition to the lumber and plywood, I used a piece of plastic laminate to cover the router table surface and a roll of oak iron on edgbanding to cover the exposed plywood edges.

Building The Cabinet

Begin constructing the router cabinet by making the frame and panel sides. You'll want to continually refer to **Figure 1** while

building the router cabinet as it details all of the parts and the joint locations. The two side walls are made of 3/4" plywood surrounded by 1 1/16" thick solid oak frames. Cut the frame rails (pieces 1) and plywood panels (pieces 2) to size and rout one edge of the rails with a 1/4" roundover bit. Join the rails to the plywood with biscuits as shown in **Figure 1**. Now cut the stiles (pieces 3) to match the overall length of the panels. Hold the stiles up to the panels and mark the points where the frame pieces intersect, then rout the length of the edge between the marks with the roundover bit. Join the stiles

to the panels with biscuits.

After the two side walls are constructed lay them on their faces and mark out the dado and rabbet locations shown above. The dados and rabbets are all 3/4" wide and 1/4" deep. In the left side wall rout two dados—one for the bottom shelf (piece 4) joint and one for the center shelf (piece 5) joint—and rout a rabbet along the top inside edge for securing the web frame (pieces 7 and 8). The right side wall requires dados for the bottom shelf joint, the center shelf joint and the two drawer dividers (pieces 9) as well as the top rabbet. Use a straight edge jig such as the one shown in **Figure 2** to guide the router while cutting the dados and rabbets. Also, while the panels are still laying face down, rout a 3/8" deep by 1/4" wide rabbet along the back edge of each side wall for installing the back (piece 6) later.

The web frame, which secures the router table to the cabinet, is made of four pieces. Rip and crosscut the two rails (pieces 7) and the two stiles (pieces 8) to size then join the frame together using the biscuit joiner



To make this jig, fasten a straight, narrow board to an oversized piece of hardboard, then rout the edge of the jig with the router and bit you intend to use for the dado. Next, align the edge of the jig with the layout line and rout the dado.

and the smallest size biscuits.

Rip 3/4" thick plywood for the bottom shelf, the center shelf and the upper section divider (piece 11) all at the same time, then crosscut the pieces to length. Glue on the solid wood banding (pieces 12 and 13). Now cut the two drawer dividers (pieces 9) to size and band their front edges with solid wood (pieces 10).

Next, rout the 3/4" wide by 1/4" deep dado in the center shelf for securing the upper section divider. The same size dados must also be routed into the upper section divider for the drawer dividers, as shown in **Figure 1**. Finish up on this piece by cutting notches out of the upper corners so that it fits around the web frame stiles.

All of the shelf dado joints in the side walls are reinforced with screws. To accurately drill the pilot holes for these #8-2" wood screws, first dry assemble the cabinet, then draw the three lines on the outside face of each side wall to indicate the center of each dado or rabbet. One hole is centered on each stile and two more are spaced on the panel. Drill 3/8" diameter by 5/16" deep counterbores for the plugs and follow the counterbores with a 5/32" diameter bit for drilling the 2" deep pilot holes.

One operation that you definitely should perform now rather than after the cabinet is assembled is drilling the pilot holes for the Blum drawer slides (pieces 28). Set the Blum slides 13/16" back from the front edge of the right side wall and the upper section divider to allow for the inset drawer fronts, and position the slides directly above each drawer divider dado. Use an awl to mark the screw locations and then drill the pilot holes with a 1/8" diameter bit.

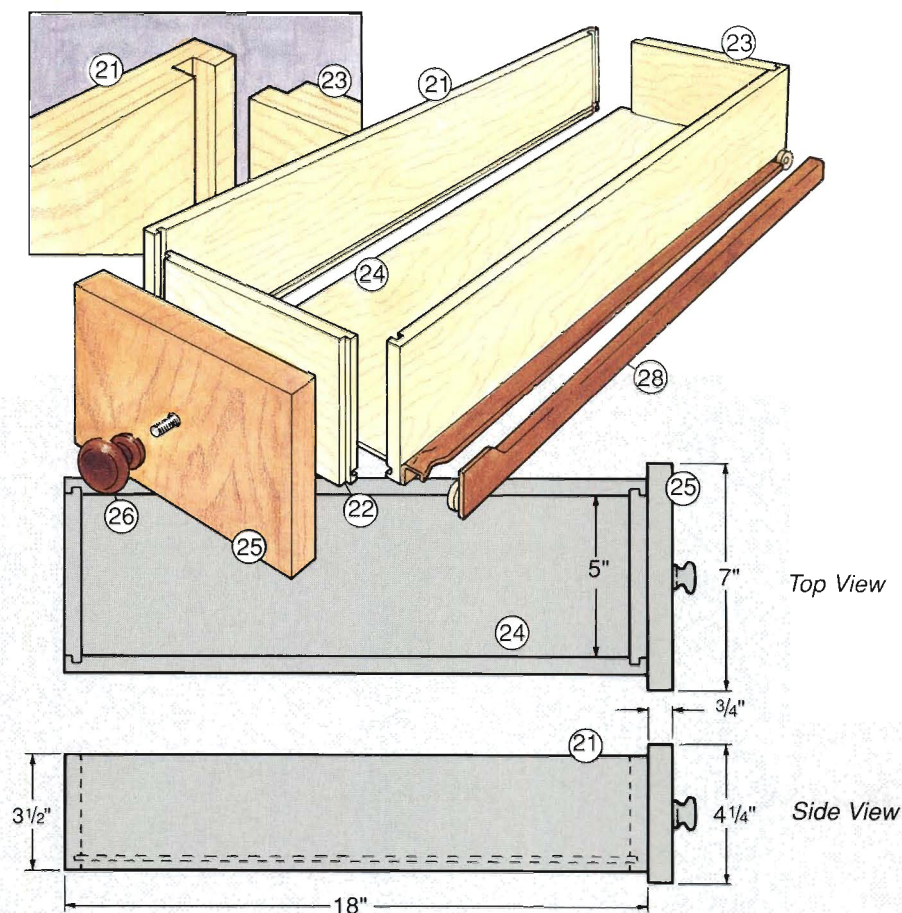
Disassemble the cabinet and spread glue in the side wall dados for the bottom shelf and the center shelf. Pull these four pieces together once again and drive the sixteen screws into place. Now spread some more glue in the center shelf dado, the two dados in the upper section divider and in the two remaining dados in the right side wall. Slip the upper section divider into the center shelf dado, then set the lower drawer divider in place, followed by the upper drawer divider, and slowly pull the assembly together.

Wrap up the carcass assembly by

applying glue to the rabbets on the side walls and drop on the web frame, slipping it over the upper section divider. Fasten the walls to the web frame with #8-2" screws, and drill countersunk 5/32" pilot holes through the web frame into the upper section divider. Secure the joints with #8-2" screws. Lastly, glue walnut plugs (pieces 14) into the counterbored holes in the side walls, and sand them flush when the glue dries.

Drawers and Doors

The cabinet doors are made from 3/4" plywood (pieces 18) banded on their vertical edges with 3/4" by 1/2" banding (pieces 19) and trimmed on the top and bottom edges with rails (pieces 20). Regularly refer to the exploded views of the doors and drawers above throughout this section of the project. Cut the plywood pieces to size then glue on the banding strips. Now cut the rails and join



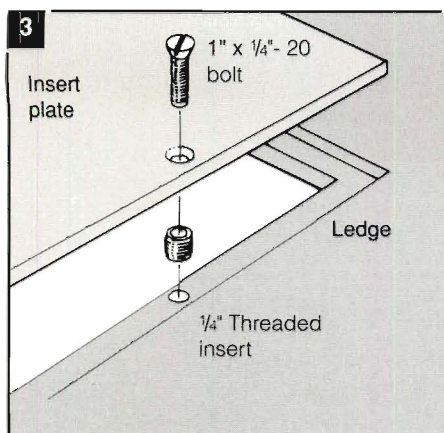
MATERIAL LIST - DOORS & DRAWERS

	T X W X L
18 Door Panels (2)*	3/4" x 11 3/8" x 9
19 Door Banding (4)	3/4" x 1/2" x 9"
20 Door Rails (4)	3/4" x 2" x 12 3/8"
21 Drawer Sides (6)*	1/2" x 3 1/2" x 18"
22 Drawer Fronts (3)*	1/2" x 3 1/2" x 6 3/4"
23 Drawer Backs (3)*	1/2" x 3 1/2" x 6 3/4"
24 Drawer Bottoms (3)*	1/4" x 5 3/4" x 17 1/2"
25 Drawer Faces (3)	3/4" x 4 1/4" x 6 7/8"
26 Drawer Knobs (3)	1" Diameter
27 Door Knobs (3)	1 1/2" Diameter
28 Drawer Slides (3)	18" (Blum)

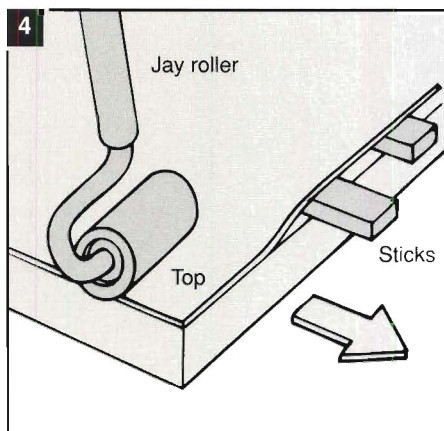
*Plywood

them to the plywood with biscuits.

The drawers are made with a simple joint which is very durable. Cut the 1/2" thick plywood drawer sides (pieces 21), fronts (pieces 22) and backs (pieces 23) to the sizes shown in the material list. Next, install a dado blade in the table saw and set it to cut 1/4" wide by 1/4" deep grooves. Clamp a spacer block onto the table saw's rip fence and, using a miter gauge, pass the drawer sides over the blade to cut dados 1/4"



Use 1/4"-20 threaded inserts and 1" long bolts to hold the interchangeable insert plates in place.



Position the laminate, then remove the sticks one at a time, rolling the laminate down as you go.

from the each end.

Move the rip fence to align the edge of the spacer block with the dado blade and make the 1/4" wide by 1/4" thick tongues at the ends of the front and back pieces to fit into the dados in the drawer sides. Readjust the blade to cut a 7/32" dado and move the rip fence 1/4" away from the blade (remove the spacer block). Cut a dado on the inside face of all the drawer pieces for holding the bottoms in place. Cut the drawer bottoms (pieces 24) to size and dry assemble the three units. Once the fit is satisfactory, glue the drawer parts together and sand them thoroughly.

The drawer faces (pieces 25) are made from solid oak and are cut to fit the drawer openings with a 1/16" gap all around. Cut this stock and attach it to the drawer fronts from the inside with a couple of #8-1" screws. With the drawers and the doors completed, drill the holes for attaching the knobs (pieces 26 and 27). You'll need to counterbore the drawer fronts to

allow the knob screws to bridge the combined thickness of the front and face. Mount the doors to the cabinet with surface mounted piano hinges (piece 16) and screw the door's roller catches (pieces 17) in place. As usual, the back panel (piece 6) is the last piece to make for the cabinet. Cut this out of 1/4" plywood, but don't nail it onto the cabinet until after the top is attached.

The Table Top

The table top is made with two layers of plywood, which accommodate the two tracks for the fence system and give the table as much vibration resistance as possible. The top of the table is covered in plastic laminate, providing a slick surface to slide the stock over and making it easy to clear off wood chips and dust. While building the table top, continually refer to the exploded view drawing at right on page 13 as it lays out all the details for constructing the top and the fence.

The first step in constructing the table is to cut a piece for the top (piece 29) to the shape shown at right from 1/2" thick baltic birch plywood, and another piece in the same shape from 3/4" baltic birch plywood for the sub-top (piece 30). Clamp the two pieces together and sand all the edges smooth. Use a sabersaw to cut 1 1/2" corner radiuses, and sand all the corners smooth.

Take the clamps off the plywood and set the top aside for the moment. Chuck a 3/4" mortising bit in the router and attach an edge guide. Now, rout 5/8" deep fence adjustment tracks in the sub-top, following the positions shown in the drawing. Once the grooves are routed, layout the rectangular insert area as shown in the drawing and drill a 1/2" diameter hole at the inside of each corner. Use a sabersaw to cut out the insert area, then sand the edge of the hole smooth. Drill the pilot holes for the 1/4" threaded inserts at both ends of the opening as shown in Figure 3.

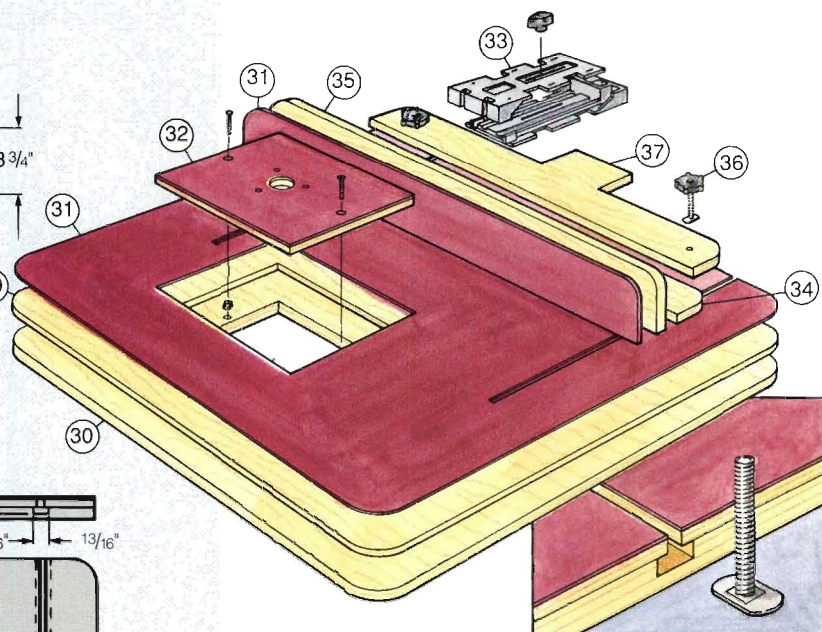
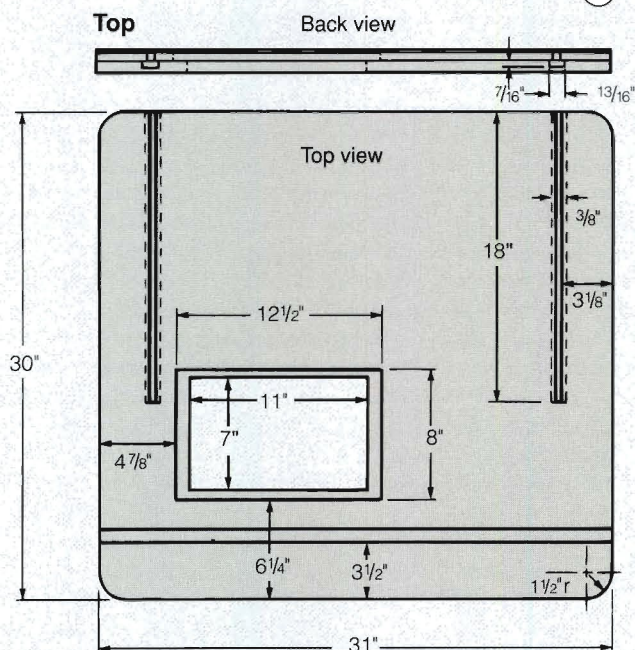
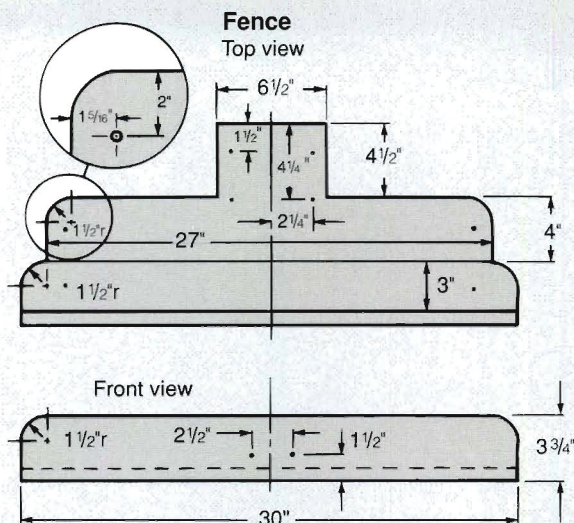
Before gluing the two top pieces together, cut the rectangular insert area out of the top piece of baltic birch plywood. You'll notice that the hole in the top is larger than the hole in the sub-top. The difference in the two holes creates a sturdy ledge to support the insert plates and the router.

Liberally spread glue over the sub-

top, keeping it at least 1/2" back from the fence adjustment track dados, and lay the top onto the sub-top. Clamp the two pieces together, making sure the edges line up perfectly and let the glue dry overnight. The next day, clean up any glue squeeze-out and apply oak iron on veneer edging to the table's edges.

Cover the surface of the top with plastic laminate, which is easy material to work with if you take your time and always remember that once anything touches the contact cement it's there forever. Cut a piece of laminate (piece 31) about one inch larger than the top all the way around and lay it upside down on your workbench. Clean the plywood and the bottom of the laminate thoroughly, removing sawdust or particles of any kind. Apply an even coat of non-flammable contact cement to both surfaces and let it dry, which usually takes about 20 minutes. After the first coat is dry, apply a second coat and let it dry. Now lay about eight narrow sticks across the table top and set the laminate on top of the sticks (See Figure 4). The sticks enable you to situate the laminate on the table before the two pieces meet and permanently bond. Begin removing the stickers a one end of the top and press the laminate to the surface of the plywood. Use a jay roller to press the laminate down once the surfaces are making contact, but avoid rolling the unsupported insert plate area. If you don't have a jay roller then use a hammer and tap against a pine block over the entire laminate surface. Once you've applied pressure to all points on the table's surface, trim any laminate overhanging the top with your router and a piloted flush cutting bit. Also, drill a 1/2" starter hole through the laminate near one inside corner of the insert plate area, then run the router around the rectangular opening to uncover the hole.

The insert plates are laminated on both sides, making them thicker than the top by 1/16". As a result, the insert area's ledge must be lowered for the top surface to be even. Chuck a piloted straight bit in your router and, following the upper edge of the insert area, lower the ledge on the sub-top by 1/16". Square out each corner of the insert area and ease all the laminate edges on the top with a mill file. Install the threaded inserts



MATERIAL LIST - TOP & FENCE

	T X W X L
29 Top (1)*	1/2" x 30" x 31"
30 Sub-Top (1)*	3/4" x 30" x 31"
31 Plastic Laminate (1)	1/16" x 48" x 48"
32 Insert Plates (3)*	1/2" x 8" x 12 1/2"
33 Incro Jig (1)	
34 Fence Base (1)*	3/4" x 3" x 30"
35 Fence Front (1)*	3/4" x 4" x 30"
36 Clamping Knobs (2)	3/8" Threading
37 Incro Jig Platform (1)*	3/4" x 8 1/2" x 27"

in the pilot holes at both ends of the insert plate area.

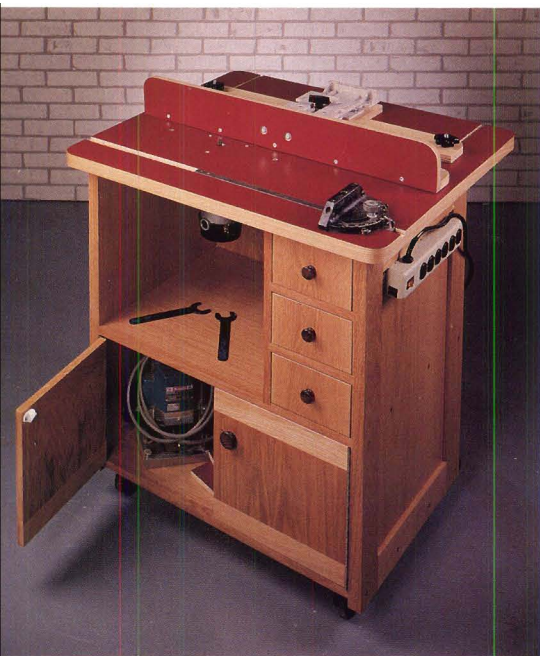
Now put a 3/8" straight bit in your router and rout the fence adjustment tracks into the top (see drawing above). Use an edge guide attachment on your router base to follow the top's side edges, routing the slot through the entire 1/2" thick plywood, centered on the 3/4" adjustment track in the sub-top.

Rout the miter gauge slot shown above, using a straight edge guide as you did for the dados on the side walls. We use our Delta Unisaw's

miter gauge for the router table, so I cut the slot to match. You should likewise size your miter gauge slot to fit your table saw's equipment.

Before moving on to construct the fence, laminate both sides of some extra 1/2" plywood to make three insert plates (pieces 32). Don't try to get by with laminating only one side of the plywood, as this will cause an unbalanced moisture exchange between the laminated side and the uncovered surface, resulting in warped insert plates. Cut the laminated plywood to fit the insert hole snug-

ly then mark the center of each insert, at which point you should drill a one inch hole in the first insert, a 1 1/2" hole in the second, and a 2" hole in the third. Be sure to ease all laminate edges with a mill file, otherwise it easily cuts up your hands. When operating the router table, choose the most appropriate insert for the bit you intend to use, and make more inserts with different hole sizes if you need them. Drill 1/4" pilot holes at either end of the inserts for securing the plates to the table. Countersink the holes so the head of the



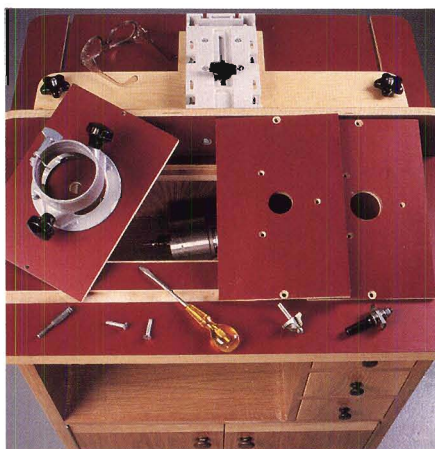
bolt sits below the laminate surface and screw one of the plates into place with 1" long, 1/4"-20 bolts.

The Fence

The heart of the fence system is an Incra jig (piece 33), which excels at making incremental adjustments for repetitive cuts. This is a great device, but it isn't always needed for general router work, so I made it easy to remove. When the jig is disconnected the fence can move freely over greater distances.

Begin constructing the fence by making the main L-bracket from 3/4" plywood, first cutting the base (piece 34) and then the fence front (piece 35). Cut the back corners of the base to a 3" radius as shown in the drawing on page 13. Laminate the fence front and drill the series of countersunk holes for screwing the front to the base. There's no need to laminate the back side of the fence front as it is restrained from warping by the base connection. Also, drill the counter-bored bolt holes for securing the Incra jig to the front. Screw the front to the base and drill a hole at each end of the base for the clamping knobs (pieces 36) and T-bolts.

We made the two adjustment track T-bolts from standard hardware store stock. Take two 3/8" inside diameter fender washers and file the hole to fit around the square nut area of a 3/8" diameter by 2 1/2" long carriage bolt. Use five minute epoxy to permanently glue the washers onto the bolt. Now



Our router table is full of convenient features that make it a more efficient shop tool. Ample storage space in the drawers and cupboard provides room for routers, bits and other accessories; the interchangeable insert plates accommodate a wide range of router bit sizes; and the fence system adjusts mechanically or the old fashioned way—with a quick tap of the hand at one end.

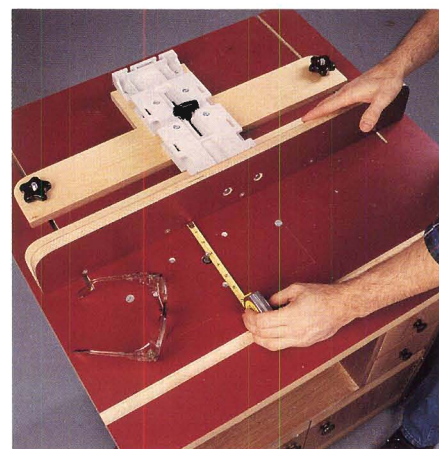
hacksaw two sides of the washers flush with the head of the carriage bolt and file or grind these edges smooth. Insert the T-bolts into the fence adjustment tracks, set the fence assembly onto the bolts and thread the clamping knobs into place.

The Incra jig platform (piece 37) is made from 3/4" plywood and has two 3/8" diameter holes for securing the platform to the router table tracks. The other four holes shown in the drawing hold the jig to the platform and need to be countersunk. Drill the 1/4" diameter holes and countersink each one on the underside of the platform. Insert 1/4" diameter flat head bolts through the platform and set the Incra jig onto the bolts. Secure the assembly with four hex nuts.

To mount the Incra jig, first undo the clamping knobs from the T-bolts and remove the fence. Now set the Incra jig platform onto the T-bolts and thread on the clamping knobs. Butt the fence into the front of the Incra jig and insert two 1/4" diameter by 1 1/2" long flat head bolts through the fence front's holes and into the Incra jig's mounting slots. Thread the hex nuts on firmly. Move the fence into position and tighten the clamping knobs. Now release the Incra jig knob to maneuver the fence into position.

Final Details

Set the router table top on the cabinet and square the two pieces to each other. Now drill a number of 5/32" holes up through the web frame into



the top for #8-1 1/2" screws, making sure to stay clear of the tracks. Countersink these pilot holes and secure the cabinet to the top.

Disassemble all the parts of the router cabinet and the table and apply a durable finish to all the wood surfaces. Once the finishing is done drill four 1/4" holes in each corner of the bottom shelf for the carriage bolts that mount the casters (pieces 15), under the cabinet. Install the swiveling casters near the back edge of the cabinet and the stationary casters along the front edge. I mounted an electrical outlet strip to the outside right wall and drilled a 1" access hole in the back panel for the router's cord. Put all the doors and drawers into the cabinet and nail on the back panel. Mount your router housing to an insert plate, then install the router motor in the housing. Now set the assembly into the insert hole in the table and secure the plate.

Constructing the router table took thirty hours and cost about \$245.00 in materials. Thinking back over the project there really isn't a particularly difficult technique or assembly, but I do recommend that you pay close attention to the layout measurements. It's following the small details that will make your router table more accurate and result in greater returns for your time and investment.

Rick White, a professional woodworker, serves on the editorial advisory board of Today's Woodworker.

SWIVELING BAR STOOLS

They swivel, they're sculpted and they even offer a touch of lower back support. All that and you can still make one of these beautiful bar stools in about eight hours. But with a project like this, you never want to make just one.

By Chris Inman

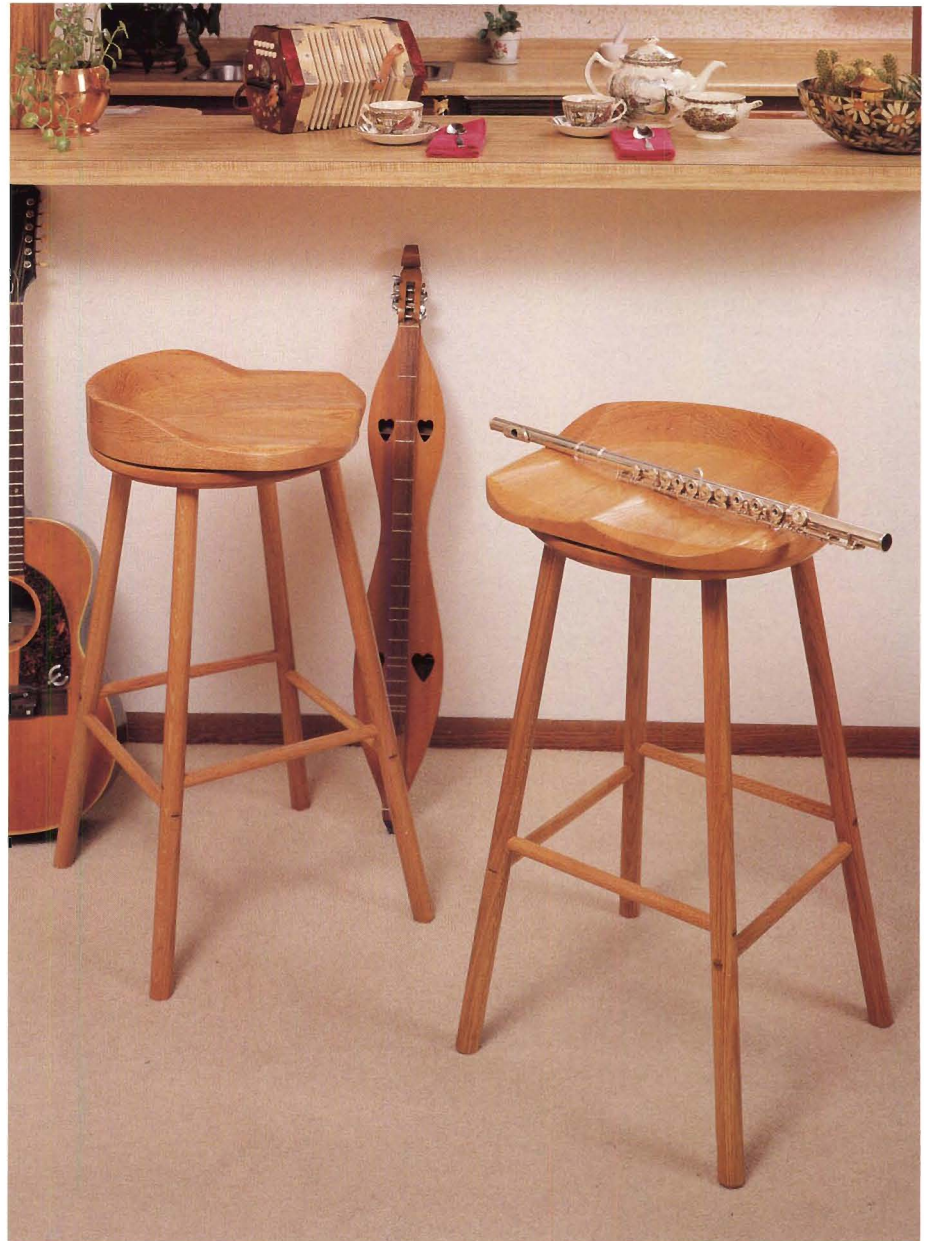
A member of the staff here at Today's Woodworker recently remodeled his kitchen and found himself in need of a couple of bar stools to complete his new breakfast peninsula. We thought this would be an interesting challenge, so our project designer was set to the task. His design turned out to be so popular with people here that we knew it would appeal to many of you.

The most important feature of these stools is their swiveling seats, which not only makes them more comfortable to sit in but also easier to get in and out of. The seat is sculpted into a saddle shape similar to the form found on many windsor chairs, and a fairly high back ridge was added for lumbar support. A stationary platform provides structural stability by joining with the legs and supporting the swiveling seat.

One of our goals with this design was to avoid using a lathe if at all possible. Therefore, we made the legs and stretchers from commonly available oak dowels. We used four 36" long by 1 1/4" diameter dowel rods for the legs, and selected two 36" long, 3/4" diameter rods for the stretchers. Making the seat and platform requires 4 1/2 square feet of 1 1/8" thick red oak and 1 1/2 square feet of 1 3/4" thick red oak. Total cost of each stool, including the swivel mechanism, came in at approximately \$50.00.

Routing The Legs

In deciding not to use a lathe for this project we created a challenge for ourselves. Normally, the tenons on the ends of all the legs and stretchers are turned, but we came up with a simple router jig that proved to be even easier than using a lathe. We also used this set up to round over the bottoms of each leg. Before routing however, crosscut all the leg dowels to a length of 29", which leaves a little extra trimming material to cut away after the stool is assembled.



Mount your router in a router table and install a 1/2" roundover bit to roundover the bottom edges on the four legs (pieces 1). Clamp the fence 5/8" away from the center of the bit and raise the bit so that the outside tip of the curve is even with the table surface as shown in **Figure 1** on the

next page. Turn on the router, slide the dowel into the bit until it contacts the bearing and begin spinning the dowel in place. Make sure to always approach the cutter from the right (as you face the bit) so that the rotation forces the stock against the fence. Now install a 3/8" diameter straight



Figure 1: The first operation on the router table is rounding over the ends of the legs. Clamp the fence 5/8" away from the center of the bit, then carefully approach the spinning bit from the right side until the dowel contacts the bearing. Now rotate the dowel in place to roundover the entire edge on the bottom of the leg.

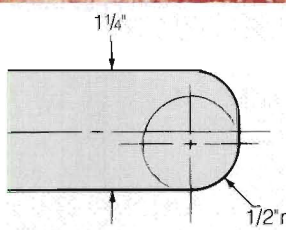
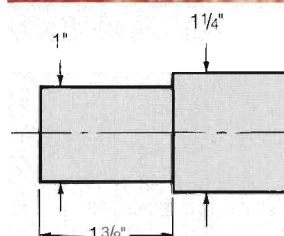


Figure 2: The next step on the legs is routing the tenons. Install a 1/2" straight bit in the router and clamp a stop block to the fence. Approach the bit from the right until the dowel touches the stop block, turn the leg once to cut the shoulder, then slide the dowel in and out over the bit to remove the rest of the waste.



bit in your router table to form the leg tenons, but don't move the fence from its position. Clamp a stop block to the fence 1 3/16" beyond the center of the bit in order to limit the length of the cuts to 1 3/8". Raise the tip of the bit 1/8" above the table surface. Start the router and slide the dowel along the fence until it hits the stop block. Completely rotate the dowel once to cut the tenon shoulder then begin passing the dowel in and out over the cutter a number of times to remove the rest of the tenon waste (See Figure 2). At this point, drill a one inch hole in some scrap wood and test your tenon for a snug fit.

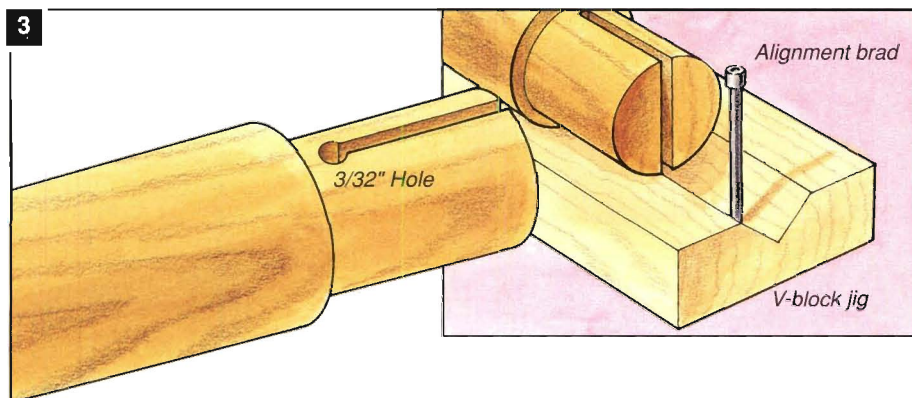
Due to the stools flaring legs, two different stretcher lengths are required. Cut one of the 3/4" diameter dowel rods into two pieces 15 5/8" long for the upper stretchers (pieces 2), and cut the other 3/4" dowel rod into two pieces 16 1/16" long for the lower stretchers (pieces 3).

To rout the stretcher tenons, leave the bit height at 1/8", clamp the router table fence 3/8" from the center of the bit and reposition the stop block 7/8" beyond the bit's center. Now rout tenons on both ends of each stretcher exactly as you routed the tenons on the legs. Once again,

before moving on test the fit of the tenons in a 1/2" diameter hole.

You'll need to cut kerfs in all the leg and stretcher tenons so the joints can be wedged when the stool is assembled. Make a simple V-block jig about 13" long to hold these pieces steady and to register the kerf alignment as shown in Figure 3. Clamp a fence on your bandsaw so that it's set half the width of your jig away from the blade and position a stop block 1" beyond the tips of the blades teeth. Place a stretcher in the jig and kerf one end on the bandsaw. Now flip the stretcher end for end and slip the kerf onto the small brad nailed in the back end of the jig. Cut the second kerf and it will line up perfectly with the first one. Now set the stop block on the bandsaw fence 3/4" beyond the tips of the blade's teeth for cutting wedge slots in the leg tenons. Remove the nail from the V-block jig, set a dowel in place and cut the kerfs in the leg tenons. Once all the kerfs are cut, drill a 3/32" diameter hole at the bottom end of each one to help prevent the dowels from splitting when the wedges are inserted.

Before you drill the joint holes in the legs, remember that each leg is a mirror image of its neighbor. The best way to complete the drilling pattern is to make another V-block jig



Aligning the kerf cuts on the stretchers is done by using a V-block with a brad centered at one end. Set the dowel in the V-block and cut a kerf in one tenon, then flip the dowel end for end and slide the kerf over the brad. Now make the second cut in perfect alignment with the first kerf. Once you've cut all the kerfs, drill a small hole to help keep the dowel from splitting when the wedges are inserted.

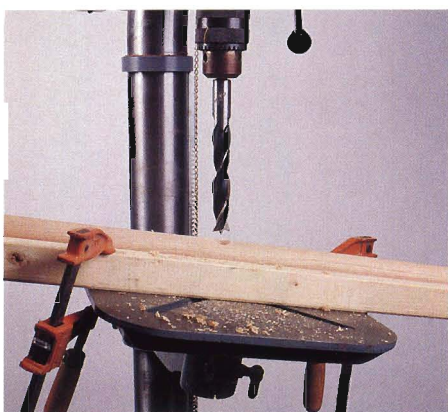


Figure 4: By clamping the V-block to the drill press table you can hold the dowels steady and precisely line up the joint hole locations with the drill bit.

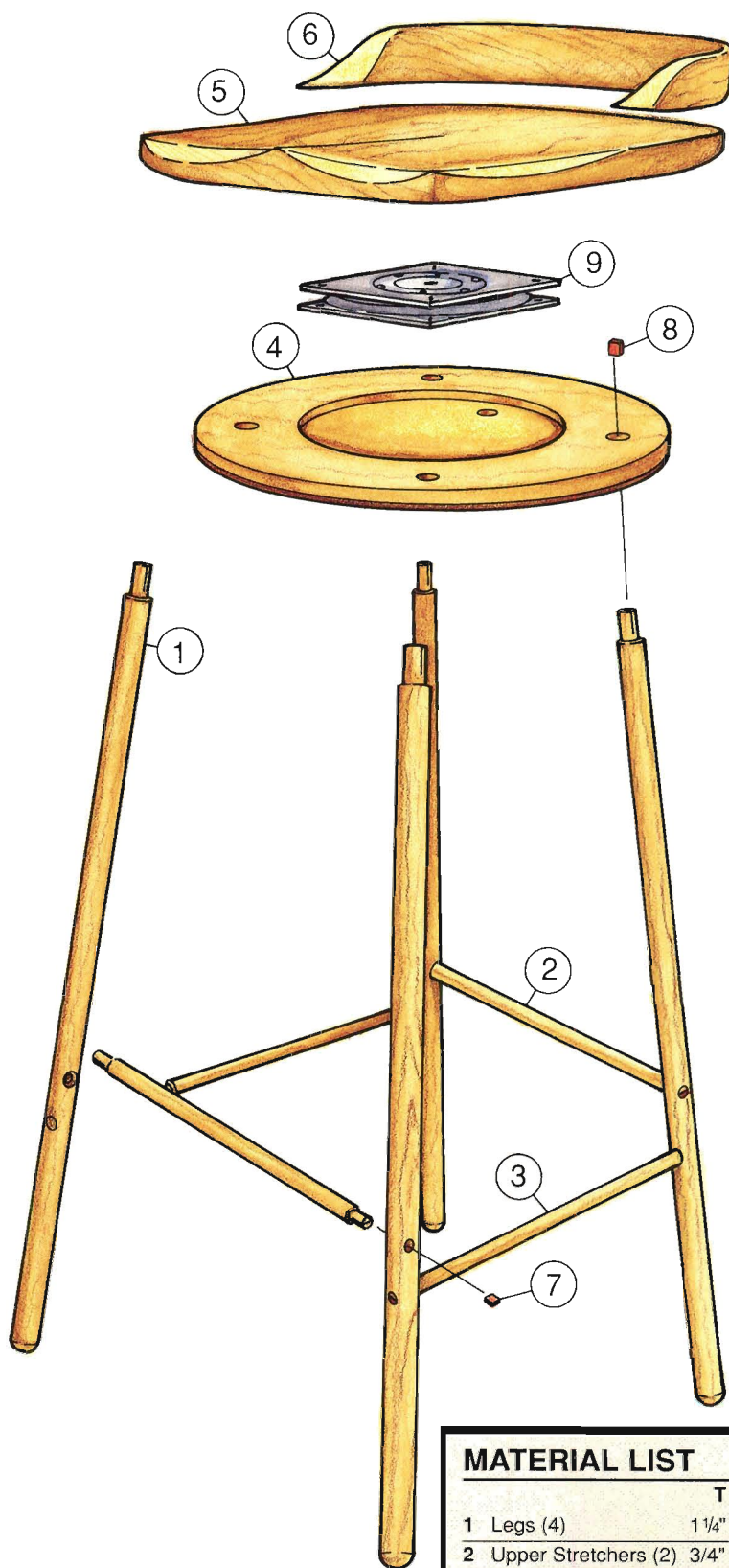
that's 30" long. Drive a brad into the center of the "V" at one end of the jig and slip one leg's tenon onto the brad. Measure from the bottom end of the leg and mark the upper stretcher joint hole location. Now take the V-block jig and leg over to the drill press, tilt the table to 80°, and clamp the jig to the table so the 3/4" diameter drill bit is centered on the leg hole location. Be sure to keep the V-block parallel with the quill on the drill press. Drill the 3/8" deep counterbore on this leg, and then on the other three legs. Keeping your jig clamped in place, switch to a 1/2" diameter bit and drill through the legs at each counterbore location to complete the upper hole joints.

Set the first leg back in the V-block and turn it clockwise 90° so the tenon kerf is at a right angle to the brad. Measure from the bottom of the leg and mark the lower hole location. Clamp the V-block on the drill press table to align the 3/4" bit with the mark and drill the counterbore as shown in **Figure 4**. Take one more leg and follow this procedure exactly. With the last two legs, however, you'll have to turn them counterclockwise, instead of clockwise, to bore the lower joint holes.

Before getting into the seat construction, cut enough wedges for all the stretcher and leg tenons. You'll need eight 1/2" wide wedges for the stretchers and four 1" wide wedges for the legs.

The Platform

Begin working on the platform (piece 1) by joining enough 1 1/16" thick oak to make a 17" square. After the glue has cured cut the slab into a 16"



MATERIAL LIST

	T x W x L
1 Legs (4)	1 1/4" x 1 1/4" x 29"
2 Upper Stretchers (2)	3/4" x 3/4" x 15 5/8"
3 Lower Stretchers (2)	3/4" x 3/4" x 16 1/16"
4 Platform (1)	1 1/16" x 16" x 16"
5 Seat (1)	1 1/16" x 18" x 16"
6 Backrest (1)	1 3/4" x 18" x 8"
7 Wedges (8)	3/16" x 1/2"
8 Wedges (4)	1/4" x 1"
9 Swivel (1)	Heavy Duty



Figure 5: Rout the recesses in the platform and seat using a template and a piloted straight bit. Since the router base won't reach the center of the circle from the template's original position, move the template over as you go.

square. The swivel mechanism is 7/8" thick, and we didn't want this big of a gap showing between the platform and the seat. To get around this, we recessed the swivel into both the platform and the seat by 5/16", leaving a gap of 1/4". Make a 16" by 16" template from 1/2" thick plywood, then cut a 9" diameter circle out of the center of the template with a saber saw. Put double sided tape on the template and attach it squarely to the underside of the oak platform. Use a bearing guided straight bit in your router to follow the template for removing the 5/16" deep recess (**See Figure 5**). You'll have to reposition the template halfway through this operation for the router to reach the center of the circle. Save this template so you can use it later for routing the underside of the seat.

Your drill press should still be set at an 80° angle, but now install a 1" diameter drill bit for boring the leg joint holes in the platform, as shown in the elevation drawing on the next

page. After the four leg holes are bored, reset the drill press table to 0° and drill a 5/8" diameter access hole in the recessed area of the platform. This access hole allows you to insert the screws for securing the swivel to the seat.

Now find the center of the 16" square platform and use a compass to draw a 15 3/4" circle. Cut the circle on the bandsaw and sand the edge smooth with a belt sander. Next, set the platform upside down and rout a large chamfer on its edge.

The Seat

Glue up the seat blank (piece 5) from several pieces of 1 1/8" thick material to form an 19" wide (across the grain) by 17" long (with the grain) slab. Later, you'll add material to get the extra thickness needed for the seat's back ridge. Once the glue is dry size the slab to its working dimensions of 18" by 16" and proceed to rout the recess the underside of the slab to hide the swivel

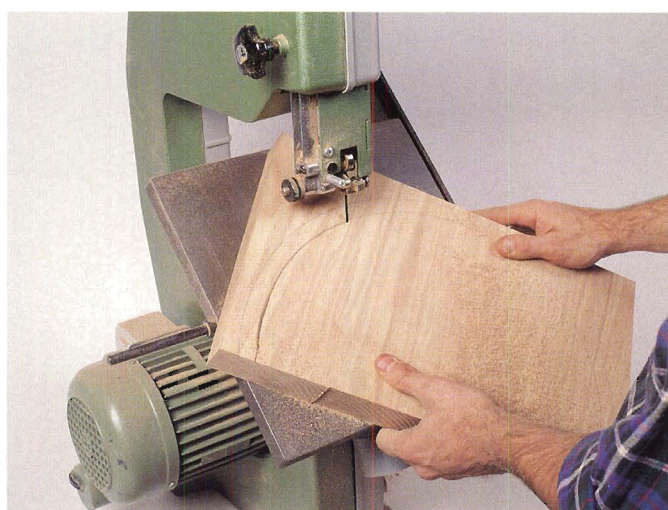
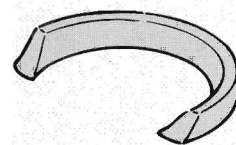


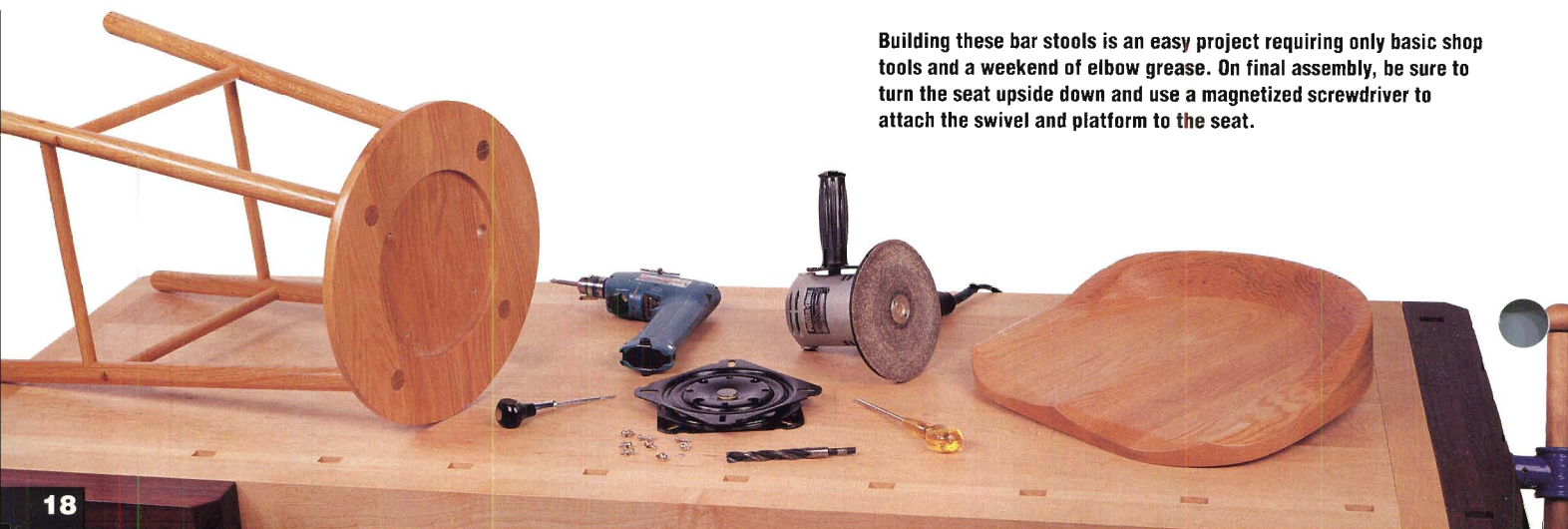
Figure 6: The back rest is cut at a steep angle and later, using a disc sander, blended with the contoured saddle shape of the seat. Set your bandsaw table at a 50° angle and cut the slab freehand along the inside line, but don't cut along the back line until the ridge is joined to the seat and the bandsaw table is set at 0°.



(following the same operation you used on the platform).

Draw the contour lines shown in the elevation drawing on the next page onto your seat and roughly rout the waste away using a 3/8" diameter straight bit. Operating the router freehand, remove the waste from the 1/8" deep areas first, and then from the 1/4" deep areas. In each of these operations use your first cuts to define the outline of an area and then come back to rout away the interior.

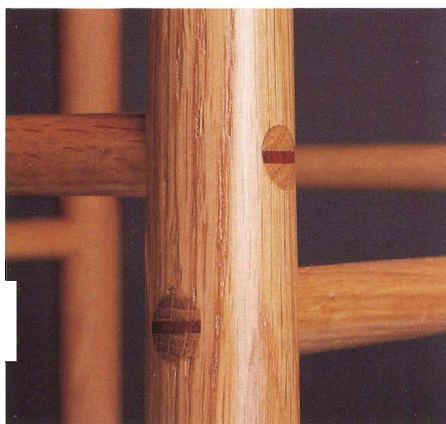
The backrest (piece 6) is made by joining enough 1 3/4" thick stock to form a slab measuring 8" long (with the grain) by 18" wide (across the grain). Allow the glue to dry, then draw the inside curve of the backrest onto the slab and use a bandsaw to cut along this line at a 50° angle (**See Figure 6**). Now, matching the inside curve of the back rest as closely as possible to the curved layout line on



Building these bar stools is an easy project requiring only basic shop tools and a weekend of elbow grease. On final assembly, be sure to turn the seat upside down and use a magnetized screwdriver to attach the swivel and platform to the seat.

the seat, glue the two pieces together. Let the glue dry, then layout and cut the seat's outside shape.

Begin disc sanding the seat and back with 36 grit paper to blend all the contours together and to put the edge facets on the seat as shown in the elevation views at right. Gradually move into finer grits as the seat comes closer to the desired shape, finishing on the disc sander with 120 grit paper. Use a palm sander and hand sanding, beginning with 100 grit and ending with 180, to complete the formation of the seat.



Final Assembly

Assembling any chair or stool is a balancing act because all the parts need to come together at once. The best way to control this chaos is to get all the stool parts organized, making sure you've got the wedges handy along with the glue, a rubber assembly mallet and a hammer for driving the wedges. Go through a dry run to make sure everything fits before you start applying glue to the joints.

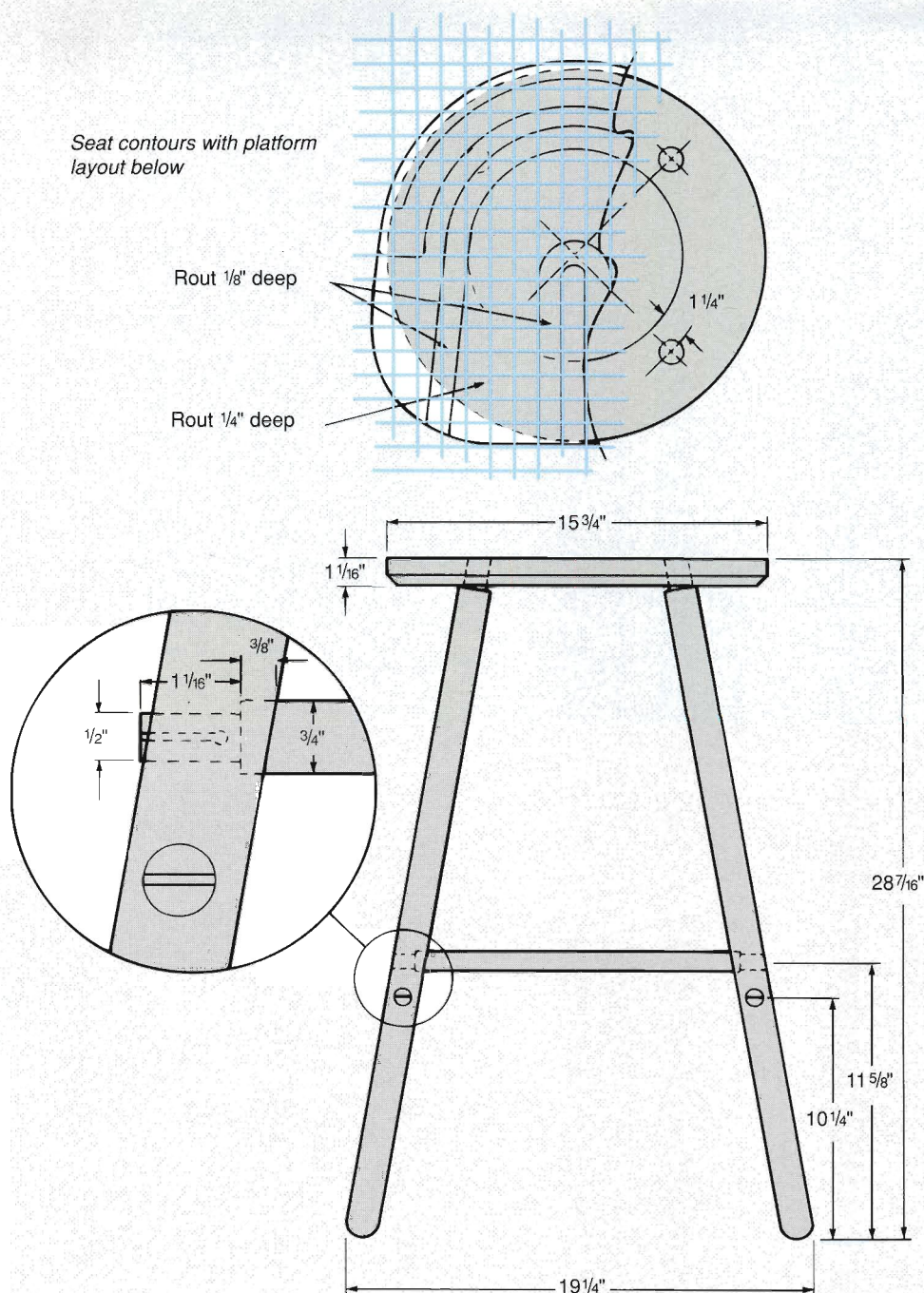
Spread glue into two of the platform holes and partially insert one pair of legs. Now put glue into the stretcher joint holes in these two legs and insert the stretchers. Install the short stretchers into the upper holes and the long stretchers into the lower holes, and always check to see that the kerfs are installed perpendicularly to the grain in the legs. Add the other legs and stretchers one at a time, using the rubber mallet to drive any stubborn tenons into place. Put a little glue on the padauk wedges (pieces 7)

and drive them into the tenon kerfs with the hammer.

When the glue has dried, cut the excess off all the leg and stretcher tenons with a Japanese saw and sand the entire stool through 180 grit. After sanding all the parts smooth, I stained the stool with Minwax golden oak stain followed by a quality varnish.

Install the swivel (piece 8) in the center of the platform, first drilling the pilot holes and then driving the screws. Now tip the platform over onto the bottom of the seat and adjust the two pieces until the perimeter of the seat uniformly overhangs the platform edge. Use the access hole in the

Seat contours with platform layout below



platform to insert the drill bit for drilling the pilot holes and the screws to hold the seat down on the swivel.

While building these bar stools we found that making one takes a fair amount of time, about eight hours, but building more stools takes less and less time per stool. This project is ideally suited for a production run and, given the popularity of this stool around here, you'll have lots of people offering to take them off your hands.

Chris Inman is the associate editor of Today's Woodworker magazine, and a professional woodworker.

SOME NEW ANGLES ON THE OLD WASTEBASKET

Use a unique dovetail router bit and a few simple gluing fixtures to create a beautiful staved wastebasket fit for a woodworker.

By Frank Martin

Wastebaskets are something most people never think twice about. They buy a plastic container at their local discount store and stick it in a cupboard. But not a woodworker. If something can conceivably be made of wood, we'll try it, and if it's been made of wood, we'll keep trying to improve it. As woodworkers, I sometimes think that one of our challenges is to take even the most ordinary item and turn it into something more useful and more attractive.

That's exactly what I've done here. My wastebaskets are simple to build and are nice enough to use in any room of the house. And making these containers serves a very useful purpose in my shop—I often end up with narrow or short waste pieces after completing a larger project, and making wastebaskets with these scrap pieces is much more creative than cutting them into kindling.

Getting Started

First collect all the stock to begin making your wastebasket. I make my canisters 16" tall, so I look for scraps about 18" long then crosscut them to length after all the other machining is done. Choose pieces at least 1 1/2" wide. Since most of my scraps are 3/4" thick, I resaw them in half to get

the greatest yield. For the basket described here you'll need 30 slats, although I recommend cutting a few extra for test cuts and to have around just in case you make a mistake. If you lack the tools to resaw and plane your scraps you can buy 1/4" thick stock through mail order suppliers.

Joint one edge of the 3/4" thick by 18" pieces and then rip the lumber into 1 3/8" wide strips. Be

sure to use a sharp saw blade to form crisp, clean edges—a dull blade tears the wood, resulting in a ragged joint when the pieces are glued together. Next, resaw all the strips in half on a bandsaw, which will handle this operation safely. Clamp a fence 3/8" away from the blade to make these cuts. Always use a push stick to pass the last few inches of the stock through the blade. Once the resawing is finished, plane the strips to 1/4" in thickness. The slats are now ready for the next step, which is the key to building this wastebasket.

Beveling the Edges

Whether the wastebasket is a perfect circle or elongated into an oval, the basic principle is still the same—all the pieces in the curved segments require beveled edges so that as the slats are joined together they each turn a small amount, and gradually add up to a 360° circle.

I get the best and most consistent joints by using a 7 1/2° dovetail bit to cut the bevels on the slats (*available by mail order through Eagle America at 800-872-2511*). The beauty of using this bit is that 7 1/2° is evenly divisible into 360°. Joining two slats with their edges routed at 7 1/2° creates a 15° bend. The half circle at each end of the wastebasket is comprised of 180° so twelve beveled joints are required to turn the slats



through this arc. Ten of these joints are made by gluing together slats with bevels on both edges (pieces 1), and the last two joints are formed when the transition slats (pieces 2), which are beveled on only one edge, are added to each end of the half circle.

Set up the router table and chuck the dovetail bit in the router. Raise the bit to project above the table surface $5/16$ " and clamp a fence exactly $1\frac{1}{4}$ " away from the lowest point on the bit (See **Figure 1**). Rout one edge on 26 of the slats and then reposition the fence $1\frac{3}{16}$ " away from the bit. Now rout the other edge on 22 of these slats (pieces 1), making sure that both bevels are cut on the same face on all the slats. The four pieces with only one beveled edge are the transition slats (pieces 2) that blend the curved segments into the flat side areas. Now set the fence on your tablesaw exactly $1\frac{3}{16}$ " from the blade and rip your remaining four square slats (pieces 3) to size along with the unbeveled edge of your four transition slats.

When all 30 pieces are cut to width, use the tablesaw to crosscut the slats to 16" in length. Once the pieces are cut, set up a $7/32$ " wide dado to cut $1/8$ " deep grooves in the slats for holding the wastebasket bottom (piece 4) in place. This truly is an odd width, but most $1/4$ " plywood is actually closer to $7/32$ " thick and, believe me, I've made the sloppy mistake of cutting $1/4$ " dadoes for this purpose so often that I've learned to anticipate the problem. Clamp a spacer block on the rip fence and adjust the fence to make dado cuts $1/4$ " from one end in all the slats, as shown in **Figure 2**.



Figure 2: When crosscutting or dadoing the slats, always use a spacer block to prevent the wood from binding between the fence and blade.

Note that among the four transition pieces, two slats must enter the blade bevel side first while the other two must enter the blade with their square edge first. This is necessary since the slats on either end of the half circles are mirror images of each other.

Joining the Slats

Before you start joining your slats together, make the special angled gluing jig shown in **Figure 3**.

This jig effectively holds one beveled slat while another one is joined to it. The trough running down the middle of the jig allows excess glue that's squeezed from the joint to flow away from the stock, helping to create a cleaner operation. Run a bead of glue on the edge of one slat with bevels on both edges (pieces 1) and slip this piece under the jig's hold down cleat. The glued edge of the slat should overhang the runoff trough. Now put glue on the edge of another double beveled slat and place it on the jig. Remember that the dadoes for holding the bottom, as well as the ends of the slats, must line up. Hold the assembly tight with spring clamps which, if positioned correctly, will force the sloped piece into the stationary slat to close up the joint.

Continue gluing pairs of double beveled slats together until you have ten complete sets. This will leave you with two double beveled slats which should each be joined to one of the transition pieces (pieces 2). While you're waiting for the glue to dry on the beveled pairs of slats, pull out a few bar clamps and join the two sets of square edged slats (pieces 3) making up the flat segments on the wastebasket. There are now two transition slats left and these should be glued to the two piece flat segments you just glued up. As soon as the glue sets during any of these assemblies, remove the slats from the jigs and clean off the glue squeezeout with a slightly dulled chisel.



Figure 1: Bevel one edge on 26 slats while they are slightly oversized, then reset the fence to bevel the second side on 22 of these slats. Remember to always approach the bit so that it is rotating into the stock, which in this case is from the left.

Forming the Half Circles

After all the beveled slats are joined in sets of two, begin gluing the pairs into sets of four. To help with this assembly, cut a piece of scrap pine measuring $3/4$ " by $1\frac{1}{2}$ " by 20", and snugly install it into the tablesaw's miter gauge slot. Take another piece of $3/4$ " pine, cut it 3" wide by 14" long, and rout a $3/4$ " wide by $3/8$ " deep dado down the middle of one face. This will serve as the platform for the clamping weight during assembly, as shown in **Figure 4**.

Spread glue on the slat edges that will be joined and set the two pairs of slats between the saw fence and the pine strip. Now move the tablesaw rip fence toward the pine strip until each of the assembly's outside edges contacts either the fence or the pine strip. Next, set the pine platform on top of the assembly with the dado straddling the joint line and add a few pounds of weight to force the joint together. I prefer to use sand packed into a small bag for my additional weight. Sand is dense, so it doesn't take much to get the weight I need, and the sand bag conforms to the platform, spreading out the weight while staying balanced. Put some paper under the joint to catch any glue drops as they will stain the cast iron tablesaw surface.

You'll soon have six segments containing four slats apiece (two of which

start with a transition slat), and two flat segments, each of which also begins with a transition slat. Continue using your sliding gluing jig and glue two of the four slat segments together, making sure that one segment of each begins with a transition slat. To complete one of the half circles, join this eight slat segment to another four slat segment that doesn't include a transition piece. Repeat this process with the other half and you'll end up with four subassemblies; two half circles and two straight segments.

Completing the Circle

Dry assemble all the pieces in the wastebasket, drawing the two circular ends together with the two flat segments. Place a spring clamp on each unglued joint to hold things steady and wrap a couple of web clamps around the container. Check to make sure all the joints fit evenly and trim the flat segment edges if necessary.

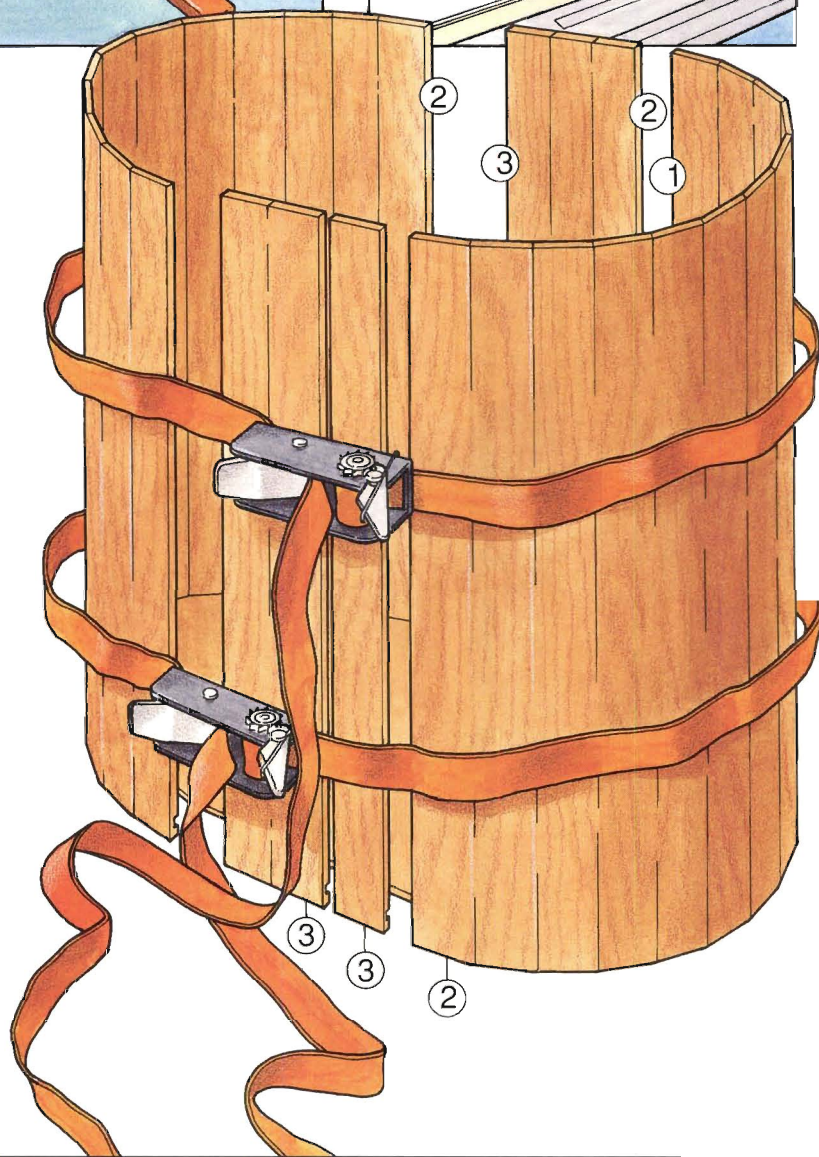
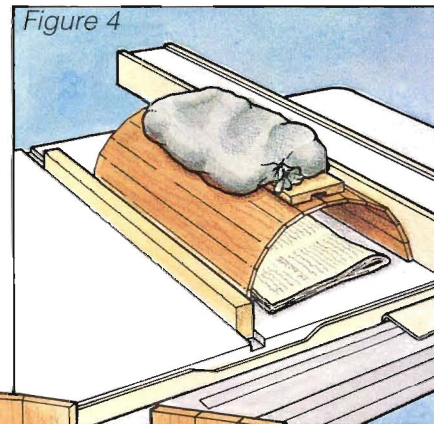
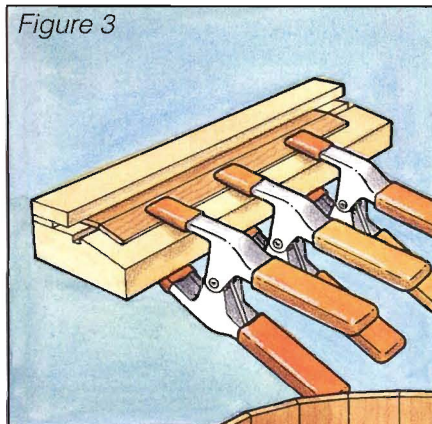
While the basket is assembled trace its inside shape onto a piece of 1/4" plywood. Now enlarge the outline by 3/32" to get the full shape of the bottom (piece 4). This extra material reaches into the dado in the wastebasket wall. Cut the bottom shape out of the plywood sheet with a bandsaw then slip the panel into the wastebasket dado to make sure it fits.

Put glue on the remaining joints and into the bottom dado. Insert the bottom into one of the half circles and add the rest of the walls around it. Put the spring clamps back into place and pull the web clamps tight around the wastebasket.

Clean up as much glue as possible at this point, for getting dried glue out of the inside of the wastebasket later is very difficult. Use a damp rag to wipe the glue away, continually rinsing the rag in clean water in order to avoid pushing the glue around on the wood.

Once the assembly is dry, round over the top and bottom edges with a file and sandpaper, and sand the rest of the structure. Finish the wastebasket with a couple of coats of Tung Oil and top it all off with a coat of paste wax to keep the wood clean. You now have a nice enough wastebasket that you'll feel guilty everytime you throw trash into it!

Frank Martin started woodworking for a hobby after he retired as a staff engineer.



MATERIAL LIST

HARDWOOD

T x W x L

1	Beveled Slats (22)	1/4" x 1 3/16" x 16" Cherry
2	Transition slats (4)	1/4" x 1 3/16" x 16" Cherry
3	Square Slats (4)	1/4" x 1 3/16" x 16" Cherry
4	Bottom (1)	1/4" x 11" x 14" (Plywood)

How To Use Bleach In The Shop

By Jerry TerHark

There are two key reasons that bleach often finds its way into the woodworker's shop; uniformity and finishing repairs.

If you're considering using bleach, remember to always try it first on a sample area so that you'll know what to expect. It's possible that the bleach won't have a profound impact so it may not be the right answer for your problem. You may also find that the bleach solution has to stay on the wood longer than you expected in order for it to do the job thoroughly. These are things you should know before you get going on the real piece.

You should also remember that the wood must be well sanded for the bleach to work effectively. Sanding opens the pores of the wood, allowing the bleach to penetrate below the surface. As a result, more wood fibers are lightened, giving better uniformity to the wood color and greater stain penetration. Getting the bleach into the wood deeper also makes it harder to sand through the bleached layer when preparing the surface for finishing.

Bleaching is often used to blend a panel of boards so that dark areas stain the same tone as light areas. That's what I mean by uniformity. It can be applied to the whole panel to bring it to a completely neutral base, or applied sparingly to just the dark areas to get them to approximately match the lighter spots. One thing that bleach will not do is change the color of the wood after it's been stained, unless you used aniline dyes. I've found that chlorine bleach works well at removing these dyes.

Three Kinds Of Bleaches

The weakest type of bleach is ordinary chlorine laundry bleach, technically known as sodium hypochlorite. This type is often used for removing faint water splotches and for lightening wood slightly, but I've found that it's not particularly effective, especially after sitting on the shelf for a couple of months. A better option is to



pick up some concentrated sodium hypochlorite at your local paint store and mix it with warm water. This type of bleach can be neutralized with common white vinegar.

The next type of bleach suitable for using on wood is oxalic acid, which excels at removing black spots from oak. Oak is loaded with tannic acid, which easily reacts with iron to create those ugly black marks with which we are all so familiar. The iron usually comes from water or a bar clamp used during a gluing operation. The next time you have this problem, apply oxalic acid to the entire wood surface and, once the bleaching action is complete, neutralize it with baking soda and water (one teaspoon of soda to eight ounces of water).

The strongest of all wood bleaches, and the best for lightening the natural color of wood, is actually a two part bleach consisting of hydrogen peroxide and caustic soda. Pour the solutions into separate glass or plastic containers and, using a synthetic bristle brush, apply the hydrogen peroxide to the wood. Spread out any puddles that accumulate. After a few minutes, while the solution is still wet on the wood, take the same brush and apply some of the caustic soda. Let it dry and repeat the process if you need the wood lighter. When the wood has reached the desired color vinegar is again used to neutralize the bleach.

Whichever bleach you use, remember to always neutralize when you're done. If you forget to, your oversight

In our glued up sample panel, a darker middle board was purposely selected. At the left end we sanded and went right to a stain. On the right end we first tried oxalic acid (not strong enough) and then applied the two part bleach to bring uniformity to the panel. After staining, it was clear that the bleach had done its job. The middle section was bleached and left unstained.

will come back to haunt you the next day. Recently one of my students did forget, and the next day his darkly stained piece of furniture was a bright shade of orange.

It's also very important to sand before the finishing to remove the raised fibers. Don't get carried away with this sanding however, or you'll go right through your bleaching depth. I normally sand the raised grain with 240 or 280 grit paper.

Safety Reminders

When using bleach, as with any chemicals, you must always make safety your number one concern. Bleaches burn. They burn your skin, your eyes and, if enough gets on you, it can penetrate through the pores of your skin and burn very deeply. Always wear rubber gloves and goggles, and a heavy apron of some kind, preferably rubber although canvas or denim will do. Finally, and this is very important, if you're applying bleach with paper towels or old rags, be absolutely sure to soak them in vinegar before disposal to avoid spontaneous combustion.

Jerry TerHark lectures nationwide on finishing and heads Dakota County Technical Institute's wood finishing program in Rosemount, Minnesota.

Getting Started In Biscuit Joinery

By Hugh Foster

While watching public television the other day, I saw one of the nation's most famous woodworkers demonstrate the use of biscuit joinery on his mitered cupboard door frames. His work was fine until he decided to reinforce the biscuits with nails, "for strength." If he's not sure what biscuit joinery is all about, then it's a fair bet that there are quite a few woodworkers who aren't too sure either.

In use, biscuits most closely resemble dowels, although they can also replace mortise and tenon joints in many applications. The procedure for using biscuits is to first cut mating slots in the adjoining pieces with the biscuit joiner. Next, inject glue into the slots and insert the football shaped biscuits into one of the joining pieces. Draw the other piece onto the biscuits and align the surfaces so that they are flush.

Biscuit joinery provides much more flexibility than a dowel joint as the oversized slots allow nearly 1/4" of lengthwise play. Another advantage of biscuits is that they swell when contacting water based glues, which, on the one hand, reduces the need for lots of clamps, but also means that you have to work fast when aligning the joint.

Since more gluing surface is created in a biscuit joint than in a dowel joint the seams are stronger. Biscuit joinery is faster than any other joining method and the results are at least as

strong as any mortise and tenon, tongue and groove, or spline joint. Even load bearing shelves, like those in bookcases, can be biscuit joined into place. The photo at far right clearly illustrates the strength of a biscuit. Notice that the material around the joint has failed while the biscuit itself is completely intact after withstanding two heavy hammer blows—and the glue had dried for only 15 minutes! Needless to say, changing your mind about a joint is not advisable and nails for extra strength are completely unnecessary.

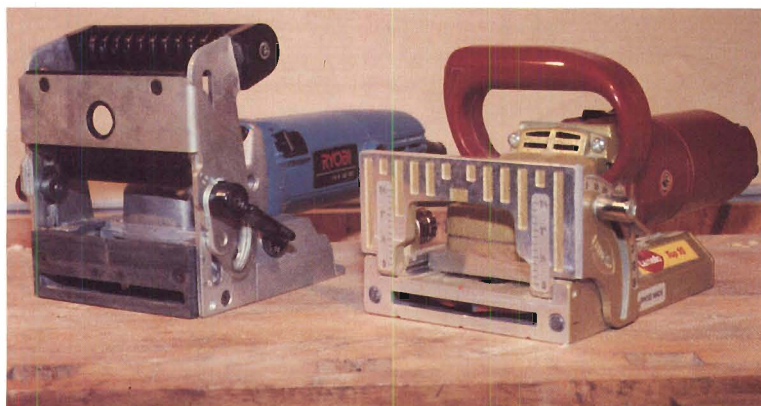
Biscuits are made of bias-cut, compressed beechwood. Three sizes are available: 0 (5/8" x 1 3/4"), 10 (3/4" x 2 1/8") and 20 (1" x 2 3/8"). Generally, the rule of thumb is to use the largest biscuit you can for the pieces you intend to join. The .148" thick biscuits are thinner than the 5/32" (.156") saw blade that cuts the slots, but the addition of glue rapidly swells the biscuit so it fills the space and grips the joining material extremely tightly. This gripping action permits you to cycle your clamps from one assembly to another faster than with other joinery techniques.

The biscuit joiner excels at making quick, accurate butt joints, but it's also good for making edge joints, internal carcass joints, and mitered joints. With practice and a little imagination, you'll adapt biscuit joinery to a wide variety of unique situations.

Moving On To Specifics

The *Ryobi JM-100* is the most interesting new biscuit joiner to reach the market. This is the first Japanese joiner on the U.S. market and it's making a serious run at the best tool in the business, the *Lamello Top-Ten*, without climbing into the same price range. The *JM-100* lists for about \$300, but a careful shopper will find it discounted for under \$235. Its 4" diameter blade runs on a 7/8" spindle, the largest in the industry, and cuts as deeply as 25/32" to easily fit the largest biscuit. Having a 180° range of adjustment, the *Ryobi* sports the largest fence in the industry, which can be used to cut miters against the inside or the outside of a workpiece (something most joiners require a series of blocks to achieve). With the largest face plate and fence of any of the joiners, the *Ryobi* has an adjustment range of 2 1/4", compared to 1 1/2" capacity on the *Lamello Top Ten* and most other joiners. Even though it offers these large features, its overall dimensions are only 11 7/16" long, by 6 11/32" wide, by 6" high.

The face plate is completely covered with rubber, making it very steady, and the tool comes with a standard dust bag. The D-handle is easy to grasp and control, and the lock-on switch is in perfect position for a right handed user.



Lamello's unit (at far left) is the Cadillac of biscuit joiners, but at about half the price the new Ryobi (left) offers comparable quality and features.

Porter-Cable (right) is the author's choice for the budget minded.



Running at 5.3 amps and 9000 RPM, the Ryobi is one of the quietest joiners on the market, a feature worth considering if you'll be using the tool for hours at a time. Very little maintenance is required and the motor brushes are easily replaceable. One thing that I noticed was that I couldn't move Ryobi's unique fence out of square. After playing around with it for a while I learned the reason for this is the fence's excellent design, and not the mere "newness" of the tool. The Ryobi offers many quality features in a very thoughtful design, and I'm recommending the JM-100 as the best available mid-priced joiner on the market.

The *Delta JS-100* stationary biscuit joiner has come down in price so that careful shopper can find it for about 300. At first I was somewhat skeptical of a stationary machine, but after using it for a year, I like it much better than I thought I would. You still can't cut internal T-joints with it, but for all other standard operations the Delta is one of the fastest and most accurate biscuit joiners around. At its current price I'm tempted to call this the best bargain on the market today. If your joinery projects don't require internal T-joints, you should give the Delta careful consideration.

The *Porter-Cable #555* is my recommended budget priced unit. Porter-Cable markets an American made joiner that has been improved several times since it was originally introduced, and it has just been improved again. Porter-Cable's latest improvement is the #556 flap face, which permits the machine to miter any angle under 90°. This is a feature I've only found on one other machine, the Lamello Top Ten.

While the #555 emulates many features of the *Lamello Top Ten*, there are reasons that the Lamello machine is three hundred dollars more expensive than the Porter-Cable. What you get for the extra money is precision,

although, as with most products of this nature, the last 3-10% of improvement may triple the price you pay. With several generations of biscuit joining machines on the market since the middle fifties, there's no company that knows more about precision biscuit joinery than Lamello. While their machines are indeed premium priced, the reasons are readily apparent.

Accessories

Lamello accessories are among the best reasons to have a biscuit joiner of any brand. Lamello has begun packaging their professional accessories for marketing in home centers and the less esoteric catalogues. Now occasional users can buy small quantities of standard joining biscuits, aluminum quick connector plates for making knock-down furniture, K20 clamping biscuits for use on projects that would be too difficult to clamp in a more standard way, C20 plates for

joining Corian and other decorative synthetic panels, and Lamello hinges, which are one of the hallmarks of elegant design. Lamello even offers a "spanner set" with three sizes of aluminum profiles that permit rapid clamping of biscuit-joined carcass assemblies.

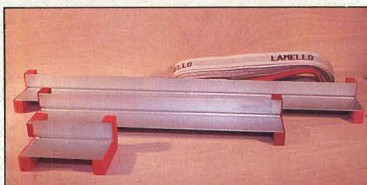
New this year from Lamello is a metered dispensing glue bottle with a plastic tip that fits the biscuit slots. This unit spreads just the right amount of glue on the walls of the slot and stores the bottle upside down so you don't have to wait for the glue to flow to the tip. Every biscuit joiner user should seriously consider this valuable accessory. It is seldom discounted from its \$45.00 list price, but you will readily recover this cost in glue and time savings. Another new Lamello product is the H-9 biscuit, which is only 1 1/2" long. This biscuit requires a special cutter that will fit any joiner except the Ryobi (due to its 7/8" spindle) and is used to join picture frame stock as narrow as 1 1/4". If you do much framing this biscuit is almost a necessity.

It may be important to note that there is no "bad" biscuit joiner available on today's market. Whether you choose the models I've mentioned from Porter-Cable, Delta, Ryobi or Lamello, or other time tested models from *Elu*, *Freud*, *Kaiser* or *Virutex*, you can be sure that biscuit joining will forever change the way you plan and build your projects. I recommend that you try the joiners with features that appeal to you, and that you make your selection based on your needs and price range. There is a good quality tool in every category and biscuit joinery is sure to revolutionize the way you approach woodworking.

Hugh Foster is an English teacher, furniture builder and freelance writer based in Manitowoc, Wisconsin.



Lamello's new line of quality biscuit joiner accessories are a real benefit to anyone who owns or plans to purchase one of these machines.



Brookfield Craft Center

Since 1954 the Brookfield Craft Center (PO Box 122, Brookfield CT 06804) has been promoting and preserving the skills of American craftsmen. This nonprofit organization has two campuses open year round and offers a wide variety of educational programs for all ages and interest levels. The Brookfield Craft Center is recognized as one of the finest nonacademic schools for professional study in America.

Besides such traditional crafts as ceramics, weaving, metal-smithing, woodworking and stained glass, the Center offers many other courses, including boat building, computer use, home building and restoration, photography, design theory, and business and marketing for artists. Their workshops are taught by nationally acclaimed artists and craftsmen. The works on these pages are all by the Center's woodworking faculty.



Hall Table; Natural Ash
By Richard Tannen

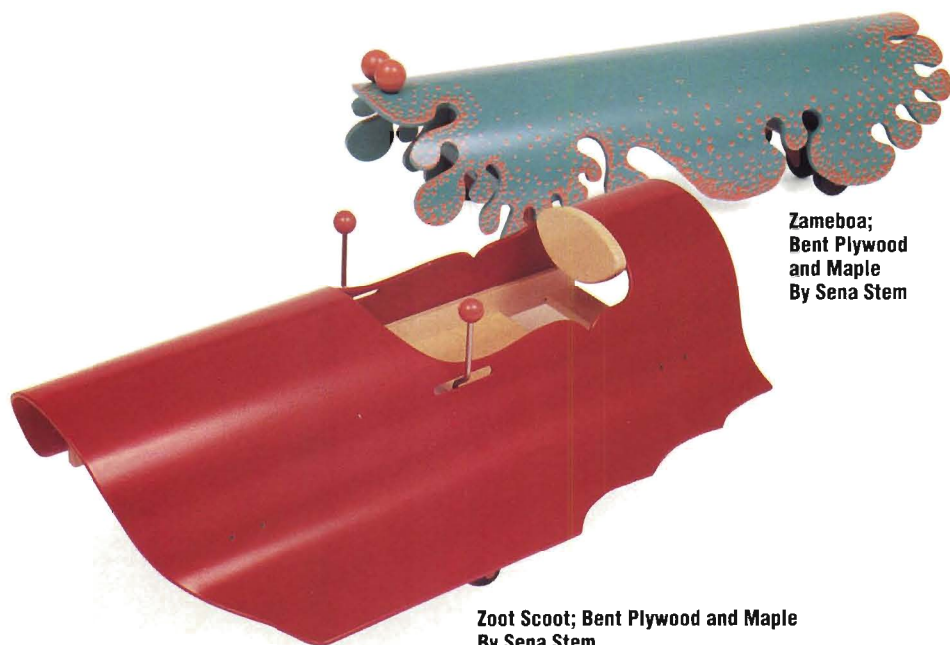


Desk; Laminated Ash
with leather top
By Jere Osgood

Desk; Australian Lacewood
By Jere Osgood



Table; Blistered Maple Veneer
with solid curly maple apron,
ebony and silver
By James Schriber



Zameboa;
Bent Plywood
and Maple
By Sena Stem

Zoot Scoot; Bent Plywood and Maple
By Sena Stem



Bench; Oak & Bubinga
By Mark Sfirri



Spindle Sculptures; Walnut
By Mark Sfirri



Folding Screen; Mahogany
By Mark Sfirri & Robert Dodge

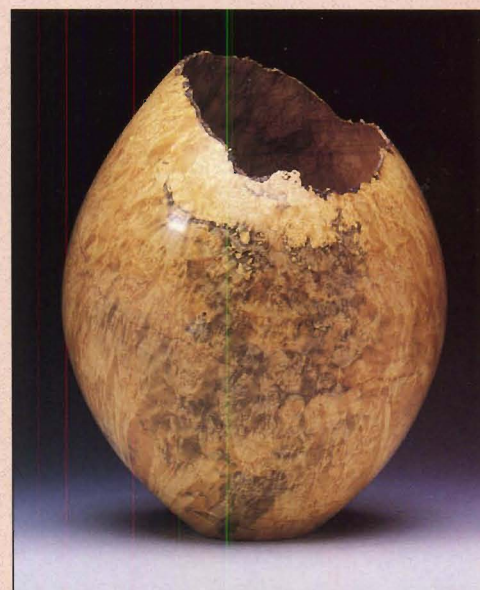
TURN, TURN, TURN



Bowl; Maple Burl
By Al Stirt

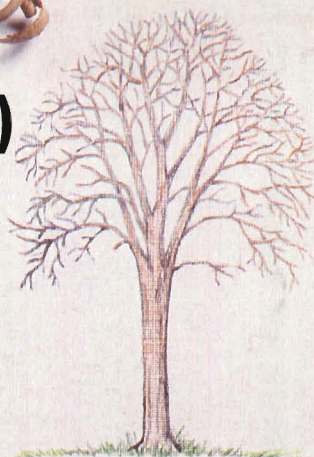


Rosewood Inhabitant; Box Elder Burl
with Rosewood Projections
By Michael Mode
(photo by Bob Garrett)



Sculptural Bowl; Box Elder Burl
By Michael Mode
(photo by Bob Garrett)

Elm (Ulmus spp.)



It comes as no surprise that the first pothole-ridden roads that helped to tame the wilderness were ruthlessly tough on wooden wagon wheels. It didn't take long for settlers to discover the clearly superior choice if wheel hubs were to withstand the violent jolts over these primitive roads. Their shock-resistant choice was elm—a species with a wildly twisting and interlocking grain pattern.

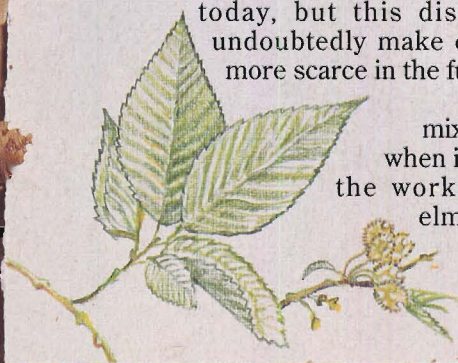
Elm resists splitting better than any other common domestic species. Anyone with intentions of turning elm into firewood will soon discover the back-breaking difficulty of splitting it with an ax. However, elm is an excellent choice when another wood member is being pounded into it—such as when the back spindles are pounded into a Windsor chair seat made from elm (a very popular choice for this application).

Dutch elm disease, a fungus carried by bark-boring beetles accidentally introduced from Europe, has ravaged nearly the entire range of elms in the United States. Supplies of elm lumber and veneer are readily available today, but this disease will undoubtedly make elm much more scarce in the future.

There are mixed results when it comes to the workability of elm. Carvers

and turners will find it to be a relatively friendly wood, but chiseling often results in uncontrolled splintering because of its interlocking grain. For a moderately hard and heavy wood (similar to walnut on both counts), elm poses no special problems for straight-line cuts made with power tools. When storing elm, be sure to protect your wood from humidity and moisture because it is highly susceptible to distortion. Like most species with a coarse, open-grained texture, elm glues, stains and finishes exceptionally well.

The reddish-tan color of elm makes it an attractive choice for furniture, accessories and trim. Generally speaking, this wood is best suited for indoor uses because it has little decay resistance when exposed to moisture, air and the ground. Ironically, when elm is completely submerged in the ground or water, it is one of the most decay-resistant woods known. Long before cast iron or concrete sewer pipes came on the scene, hollowed elm logs often served this purpose, and many were still intact centuries after being installed!



NEXT ISSUE:

The March/April 1991 issue will feature a toy box, a rocking chair and a scrollsaw/carving project that can easily be completed in a single weekend.